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Railway & Commercial Gazette

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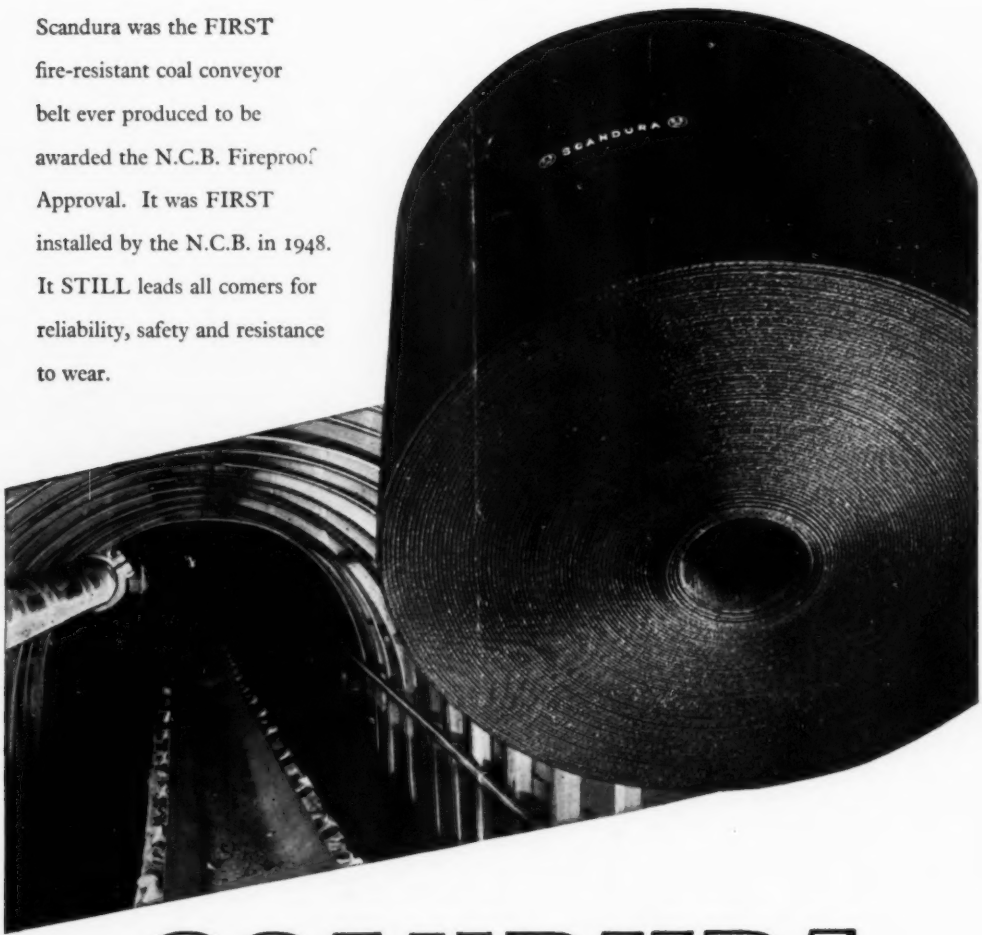

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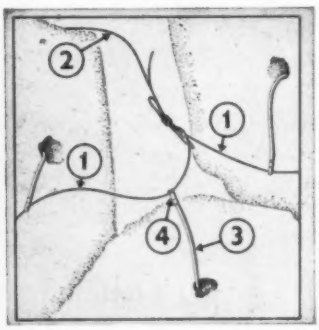

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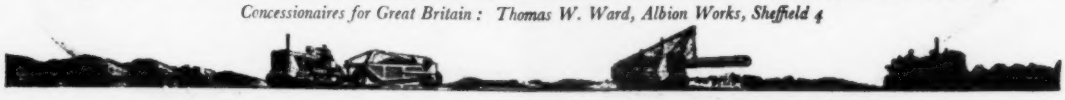
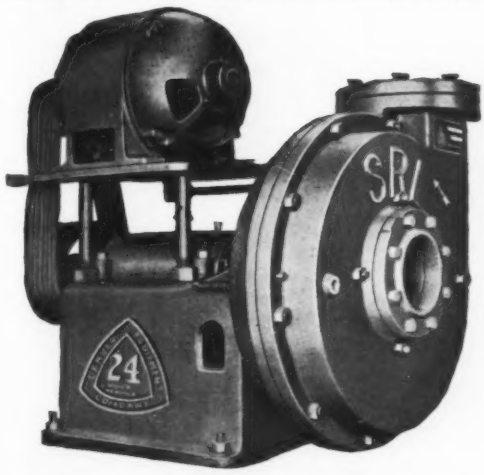


Pumping difficult liquids?



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TIB 99

MEETING THE DEMAND FOR MORE ALUMINIUM . . .

A PROGRESS REPORT **JAMAICA**

All over the world the demand for aluminium grows greater every day. Transportation, electrical installations, buildings, household appliances, and an enormous variety of other products turn more and more to the use of aluminium. Its advantages have made this versatile metal essential to material progress and increased prosperity. And, throughout the world, the Aluminium Limited Group is increasing production to meet this ever growing demand.

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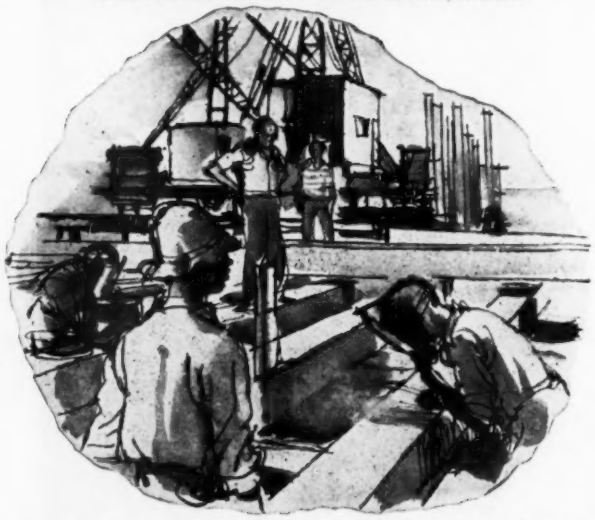
800,000 tons alumina production target in Jamaica

Alumina, the oxide of aluminium, is extracted from the ore bauxite. Geologists of Aluminium Limited first reported bauxite as a commercial possibility in Jamaica in 1942. The Company pioneered the exploration of the bauxite deposits, acquired properties and then undertook development work on the Island. The Company built the first alumina plant in the Caribbean. This started production in 1953 to meet the requirements of the Kitimat aluminium smelter in Canada. A new harbour was built and the alumina plant has been under almost constant expansion since it began operations to meet the expansion of the Canadian aluminium industry. The present expansion programme will more than double existing alumina production in Jamaica, boosting it from 230,000 tons to 543,000 tons per year by the summer of 1957. Recently the Company announced a further new plant to take the annual total to close on 800,000 tons in 1958.



The Aluminium Limited organisation has 47 fully owned or affiliated subsidiaries in 20 countries. Aluminium ingot produced by Aluminum Company of Canada, Ltd., is marketed by Aluminium Union Limited. In addition the Company markets the products of the various fabricating companies in the Aluminium Limited Group.

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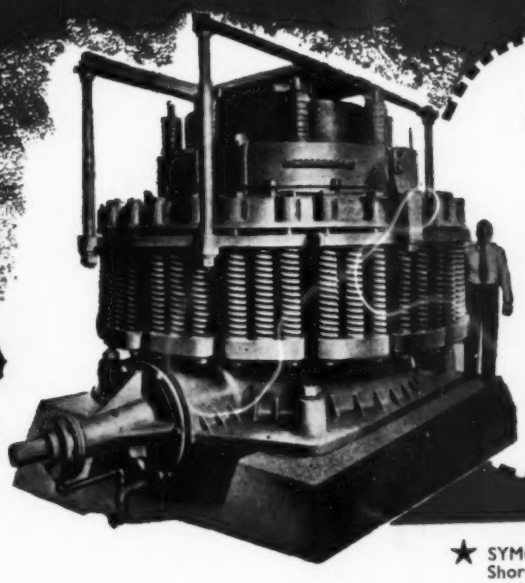

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CHROMIUM
COPPER
DOLOMITE
FELDSPAR
GOLD
GRAVEL
IRON ORE
LEAD
LIMESTONE
MANGANESE
MOLYBDENUM
NICKEL
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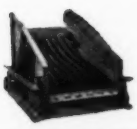

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The Mining Journal

Established 1835

Vol. CCXLVII No. 6316 LONDON, SEPTEMBER 7, 1956 PRICE 9d.

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NOTES AND COMMENTS

Mining for Jets

It would be hard to find two industries more dissimilar than mining and aircraft construction. Yet jet aircraft technology is resulting in equipment and devices having potential applications in the mining industry. By the same token, it is conceivable that aircraft designers, might with advantage devote greater attention to the progress of mining research. We do not know whether any knowledge gained from mining at great depth is applicable to problems associated with stratospheric flight, but if mining technologists can benefit from a visit to Farnborough—as well they might—it is possible that aircraft engineers could spend a profitable day at the Mining Research Establishment of the National Coal Board.

Unfortunately failure to co-ordinate the research activities of the firms and industries in different countries, who happen to be working on problems of common concern, leads to much duplication of cost and effort and—still more regrettably—to failure to make the widest possible use of the knowledge arising from research. The Department of Scientific and Industrial Research and its counterparts in other countries provide a valuable medium for the co-ordination of research and the dissemination of knowledge, while close liaison is often maintained between the research staffs of government departments and commercial firms. Most of the research and development which is carried out commercially, however, is undertaken primarily for the benefit of the firm concerned. Hence its fruits are only likely to become available outside the industry by licensing agreements or by a broadening of the company's own marketing activities.

In order to overcome this limitation, Gloster Aircraft, the Hawker Siddeley Group firm which pioneered both the first experimental and operational jet aircraft, has established a new division with the aim of taking its experience of jet aircraft technology into industry generally. This new policy is based on the belief that many devices originally developed and patented to overcome the unprecedented engineering problems associated with high-speed, high-flying jet aircraft could have a far wider application in factories and mines, in the development of automation, and even in the home.

Among the items displayed at Farnborough was a valve for the control of the flow and temperature of large volumes of warm air. Originally developed for air conditioning the cockpits of high performance fighters or for controlling the temperature of guns and guided weapons, this valve is more simple, compact and precise in operation than any normal industrial counterpart. Electro-hydraulic servo devices specially developed for modern aircraft controls are equally compact, simple and foolproof. Their applications to mining machinery or automation appear to be extensive. In another important branch of automation, the control of liquids and gases, experience in development of the pressurized fuel systems necessary for jet aircraft has led to equipment of a very advanced nature.

The mining engineer of to-day is called upon to overcome a multitude of difficult problems associated with mining at great depth and the handling of complex and low grade ores. He cannot afford to neglect developments in other industries which might assist him to achieve greater efficiency and economy in the production of minerals. It is evident that the aircraft industry, in particular, has much specialized equipment of potential mining interest. Mining engineers who are already accustomed to visit Farnborough every year will thus be able to do so in future years with the enhanced enjoyment which comes when pleasure is spiced with the consciousness of duty done.

Laying the Dust in Jo'burg

The traditional fallacy of the "hard-hearted mine bosses" received a further setback when the major South African mining houses, under the leadership of Sir Ernest Oppenheimer, offered a £3,000,000 loan to the Johannesburg City Council to be used towards eliminating the appalling Native slum areas to the west of the town, to mark the 70th anniversary of the proclamation of the farm on which the centre of the city it built.

Our South African Correspondent points out that these slums are largely the result of the economic growth in post-war years and for various reasons—many of them outside its control—the Council has not been able to deal with the situation.

Like every other country, there is shortage of capital, and the mining industry's move could not have came at a better time. None of the industry's employees live in these slums, so that it could be said that their existence is none of its business, but as Mr. C. B. Anderson in his capacity as chairman of the committee responsible for the loan, said what was originally a local problem of housing has become a national one. In the light of this it was felt that the occasion of Johannesburg's 70th birthday, a lead should be given to it and South Africa in a matter which touched so intimately not only the welfare of the Natives, but also the good name and basic outlook of the people of the country.

It was felt that the discharge of direct responsibility in respect of its own employees cannot divorce the mining industry from all interest in general Naive housing arrangements in the community in the midst of which its operations are carried on. To go even further, the mining industry cannot be disinterested in the well-being of all sections of the community. There is, of course, nothing new in this attitude as overseas visitors to the mines of this country and of the Central African Federation and also many people who have perused company reports and chairmen's speeches over the years, but it is probably the the first time that the mining industry here has taken such an important step in a field superficially so detached from its usually accepted sphere of activities.

The loan will cover the building of 5,000 houses a year for three years. There will be four-roomed dwellings costing £200 each. This low figure is possible through the work of Johannesburg's Director of Housing, Mr. A. J. Archibald, using trained teams of Native workers who do everything from putting down foundations to applying the last coat of paint.

Japanese Interest in Thailand's Minerals

In 1955 tin and tungsten were again Thailand's two principal earners of mineral revenue. Tin production for the year is estimated at 10,970 l.tons, which compares with 9,776 tons in 1954 and a peak figure of 17,390 tonnes in 1940. According to a table prepared by the United Nations Economic Commission for Asia and the Far East (ECAFE), 495 tonnes of tungsten concentrates were produced during the first six months of 1955 and exports amounted to 645 tonnes. In 1954 production totalled 1,104 tonnes and exports 1,154 tonnes. The peak figure for tungsten concentrate is 1,627 tonnes in 1952.

The Mitsui Metal Mining Co. has initiated a contract with the Yip In Tsoi Co. Ltd., of Bangkok, a leading Thai mining company, to establish a joint Japan-Thailand mining company with an authorized capital of 324,000,000 yen for development of tungsten and tin mines in Thailand. The Japanese company will supply 49 per cent of the total capital, while the rest will be provided by the Yip In Tsoi Company. Mitsui has applied to the Japanese government for authorization of this project and was planning to establish the new company on September 1 this year. The new company is expected to turn out 70 tons monthly of 75 per cent tungsten concentrate in 1958. It will first develop the four mines in Khaokiam, Wanghra, Sinsan and Namon, all of which are owned by the Thai company.

Two representatives of the Japanese Mitsubishi Company arrived recently in Bangkok to inspect a tin mine operating jointly with Thai and Japanese interests. The joint venture is The New Cheangpra Mining Company, established early last year, which obtained a 15-year concession to mine tin in Surathani, southern Thailand, and to send ore to Japan for smelting. Forty-nine per cent of the shares of the company are held by Mitsubishi and 51 are Thai-owned. According to Mr. Nai Saguan, director of the company, the present monthly output of 50 tons of ore will be stepped up to 100 tons next year.

As the result of improved transport conditions the production of lead has increased in recent years. In the first six months of 1955 it reached an estimated total of 9,000,000 tonnes compared with 11,662,318 tonnes in all 1954, 7,959,732 tonnes in 1953 and 2,460,000 tonnes in 1952. The concentrate is sold mostly to Canada, Belgium, Netherlands and West Germany. Provided that the price of lead remains at a favourable level, a much higher production is anticipated in 1956.

Iron ore mining is carried out in Thailand, but production has been small—1952, 2,857 tonnes; 1953, 2,782 tonnes; and 1954, 2,756 tonnes. A tentative programme has been in view for two or three years under which a foreign company, German or Japanese or possibly both, would investigate the possibility of putting up an iron and steel plant, making use of low grade iron deposits at Khao Um Khrum north of Kancharnaburi. The Thai government were recently reported to have approved in principle plans by a Japanese industrial concern, Nippon Koei, to make a survey of iron ore deposits. The proposal envisages the eventual establishment of an iron and steel plant by a company jointly owned by the Thai government and Nippon Koei. The Japanese concern would make sufficient capital available on loan to enable the Thai government to hold a 50 per cent participation in the joint company. The loan, if taken up, would carry interest at 4 per cent per annum.

Marble deposits in Saraburi province are to be exploited by the government. According to reports a sum of 1,000,000 baht is to be spent initially on the establishment of a factory which will take two years to complete. (Approximately 57 baht=£1.)

An Asian Nuclear Centre was proposed for United States assistance under President Eisenhower's Fund for Asian Economic Development at the Colombo Plan meeting last October in Singapore. In this connection a team of U.S. experts in the peaceful uses of atomic energy has been conducting a survey in Thailand.

On May 1 Thailand signed a loan agreement with the Export-Import Bank to repay U.S. $10,000,000 of the aid it is receiving this year from the U.S. The loan is repayable over 40 years at 4 per cent if repaid in Thai currency and at 3 per cent if repaid in dollars. This sum, together with an additional U.S. $19,500,000 which is being provided on a grant basis, will be used to help Thailand expand and improve its economy. ICA is also making available U.S. $4,800,000 in technical co-operation funds to provide specialized training for Thai nationals in professional and technical fields.

Stainless Steel Blazes the Trail

During the ten years 1946-1955 world steel production rose by nearly 150 per cent and it is still increasing. In no section of the industry has the tempo of expansion been so rapid as in the production of stainless steel, which has approximately doubled since the early post-war years. Last year U.S. mill shipments of stainless steels rose to 670,851 s.tons from 437,818 tons the previous year. All signs point to a period of even greater growth and development in the years ahead, for stainless steels are playing a key role in the development of nuclear power generation, supersonic flight, rail and road transport, electrical equipment, and other major industries.

Stainless steel is the generic term for a group of materials differing in composition but having the optimum combinations of properties for particular end uses. Various types are interchangeable in their uses, but only within limits. Much research has been undertaken by steel companies and fabricators to promote interchangeability, and, in particular, to find ways and means of reducing or even

eliminating the nickel content. The stainless steel industry is thus a major factor in determining the future demand for a number of ores and metals, not only because its continued expansion will be reflected by increasing consumption of the constituent metals, but also because the introduction of improved or more economical types might have a far-reaching impact on the general pattern of metal usage. While chrome and nickel are the metals predominantly associated with stainless steel, many compositions contain rare metals, such as columbium, on which there have been restrictions. It is believed that the stainless steel industry could eventually take at least 2,000 tons of columbium a year, providing supplies at reasonable prices were assured.

The automotive industry is by far the largest manufacturing user of stainless steel. Last year American automotive plants accounted for 143,000 s.tons, equivalent to 21.6 per cent of the total U.S. domestic shipments—nearly three times the tonnage used in 1948.

Because of its ability to resist corrosion and heat and still maintain strength, stainless steel is becoming a leading material for aircraft construction. Another of its aeronautical virtues is its ability to take and retain a smooth finish, a property which is of critical importance in minimizing the " skin friction " developed at supersonic speeds. Skin fricton at 1,500 m.p.h. also involves building into the plane equipment for protecting passengers from the heat that cannot be dispelled. For this surface heat, type 301 stainless is being specified. It contains 17 per cent chromium and 7 per cent nickel and has high tensile strength. The supersonic planes of to-morrow will be thrust through space by jet engines containing 50 per cent or more stainless steel. One jet engine already in production has more than 1,000 lb. of stainless in its main section and another 600 in the " after burner ". Generally speaking, the higher the temperature, the higher becomes the chromium and nickel content of the stainless steel to be used.

A new wind tunnel has been authorized to test design performance at speeds of up to 4,000 m.p.h.; it will be lined with stainless. Rockets that will reach this speed are also expected to involve large quantities of stainless.

By the end of 1958, Republic Steel expects to be producing more than 500 tons of stainless annually for atomic energy uses. According to Dr. Robert P. Peterson, Republic Steel's director of nuclear research, it will not be much longer before the volume of stainless production by the whole U.S. steel industry reaches 20,000 tons annually for atomic power plants and nuclear fission generally.

The pre-eminence of stainless steel in atomic energy metallurgy is due not only to corrosion resistance but also to the "cleanability " of this material and to its exceptional immunity from radioactivity. Technically, the boron-treated stainless steel selected for atomic energy tends to absorb " thermal neutrons " and reduce the flow of neutrons rapidly without producing dangerous secondary gamma radiation. Low manganese content in stainless is desirable, since manganese has an affinity for neutrons.

In the early history of stainless steel extensive use was made of the so-called " 18 and 8," which contained 18 per cent of chromium and 8 per cent nickel, or similar percentages. When the Korean war broke out, materials with high nickel content were restricted to defence requirements. Even for purposes regarded as " essential," intensive effort was devoted to the reduction of nickel content. There was an increasing tendency to use " straight chromium " types (without nickel) and these became predominant. After the Korean war many users preferred to revert to nickel types, but the return towards former practice has been handicapped by the continued scarcity of nickel. In the U.K. the shortage of nickel is among the factors responsible for the present scarcity of stainless and alloy steels.

A promising solution to the problems arising from the current pressure on available nickel supplies appears to be indicated by the development last year of a composition containing manganese in place of part of the nickel content of stainless.

The Commonwealth is richly endowed with reserves of chromite, nickeliferous ores, columbite, and other raw materials for the production of stainless steel. In view of the paramount importance of stainless in the coming era of nuclear energy and supersonic flight, the development of these resources should clearly be among the foremost objectives of minerals policy.

Portugal

(From Our Own Correspondent)

Foz do Douro, August 8.

The two tables given below show the export figures for the subject period as compared with the first six months of 1955. The WO_3 exports show a greater falling off than the figures given lead to suppose, as from the 1956 total of 2,164 tonnes the northern zone alone shipped 257 tonnes of WO_3 residues (southern zone unknown), which should be deducted from those 2,164 tonnes as no discrimination is officially made between the 65 per cent of the normal ore and the 20 per cent of the residue.

Cassiterite is a dead letter as the only shipment in six months was that of 25 tonnes to U.K. Cupreous pyrites are down. Roasted and leached pyrites show 56,028 tonnes for 1956 as against nil for 1955. Tin metal shows 162 tonnes against 56 for 1955. Haematite shows 76,803 as against 54,798 for 1955. Magnetite 33,985 as against 20,851 for 1955. Manganese 2,470 as against 5,431 for 1955. White arsenic 758 against 732 for 1955.

Material	1956 (tonnes)	1955 (tonnes)
Tungsten-Bearing Material	2,164	2,244
Ferro-Tungsten	103	115
Cassiterite	25	87
Cupreous Pyrites	210,375	225,885
Roasted/Leached Pyrites	56,028	—
Tin Metal	162	56
Haematite	76,803	54,798
Magnetite	33,985	20,851
Manganese	2,470	5,431
White Arsenic	758	732

By and large the country has not much to complain about in respect to exports during the first six months of this year. Worthy of mention is the shipment to Japan of 40 tonnes of wolframite and the first shipment of 953 kilos of tungstic acid to Hamburg. Your correspondent recently pointed out that a definite evolution was taking place here regarding the local production of materials hitherto left to other countries to make from Portuguese raw materials. In support of that which was written witness the following developments :

The Companhia Portuguese de Siderugia is to manufacture iron and steel, using locally won iron ore, and the recently formed Lisbon Company are exporters of the first shipment of tungstic acid from Portugal. In addition, Minas de Borralha now export some 200 odd tonnes of ferro-tungsten instead of selling concentrates. Minas e Metalurgia, Lda., make tungsten carbide, and plans are afoot for making tin plate, using locally won cassiterite. Two other companies have been formed for the exploitation of payable contents of WO_3 and mixed WO_3/Sn residues, the manufacture of ferro-tungsten and ferro-titanium. These developments point to the ever-growing tendency to make use of local produce for local benefit in place of allowing that local product to benefit others.

Twilight of Malayan Coal Mining

The greater use of oil as fuel in Malaya's industry is proving a serious threat to the country's coal trade. Now, with Malayan Railways in the final stages of switching to diesel locomotives, the country's only coalfield is faced with a somewhat bleak future. The following article, from a correspondent in Malaya, describes the threat to the coal mining industry in Malaya and the measures taken to counter the danger.

Although deposits of coal have been discovered in several parts of Malaya, only one has been found to be extensive enough to be of any economic value. This is operated by Malayan Collieries Ltd., and is situated at Batu Arang, about 30 miles from Kuala Lumpur.

One of the dragline excavators loading coal onto the conveyor belt from the opencast site

Coal here occurs in two main seams which dip from the outcrop at about 14 deg. The thickness varies: the upper seam, near the surface, is about 36 ft., while the lower one, which is about 200 ft. below, is approximately 22 ft. thick at the outcrop. The coal, which has been mined here since 1915 is not of the high British quality, but is sub-bituminous in nature with a tendency to ignite spontaneously. Hence certain precautions are necessary in storing the coal, which is not, unfortunately, suitable for ships' bunkers. In this connection also, it has been found useful to keep reserves of uncovered coal in the opencast.

POST-WAR OPERATIONS

After the war, the Company's policy was to develop two underground mines, and to use one main site for opencast operations. In the opencast mines modern machinery has been used to win coal by the usual orthodox methods.

Dragline excavators have been used for many years for stripping the overburden and a modern system of conveying it to final disposal has recently been added. Coal is dug by smaller excavators and taken to the screens and washed, by belt conveyors. There are four main conveyors, the longest one being about 700 yd.

Development work continued, and by 1952 up to about 1,400 tons of coal was produced per day. Plans were also being made at this time to meet increasing demands for coal. Then, early in 1953 the first threat of oil fuel began to be felt. The government-supported Malayan Railways and power stations found that imported oil fuel enabled them to operate at lower costs than with locally produced coal. So the railway and power plants gradually began to switch to the cheaper fuel, with the result that coal production at Batu Arang has fallen from an average of about 30,000 tons a month to about 15,000 tons.

During this process of changing over to oil, Malayan Collieries have been fighting a losing battle. In vain did the company try to come to terms with the government. They asked the government to support them by retaining a certain number of coal-burning locos and power-generating units so that the mine could operate economically.

They even offered to supply coal at a reduced price. But the government stood its ground and maintained that there was not sufficient evidence to show that deep mining at Batu Arang was a sound long-term proposition.

POLICY OF ECONOMY

So, faced with being strangled by imported oil, and future losses of hundreds of thousands of dollars yearly, the company has been quick to act. The whole of their future development plans have been reframed. Coal operations have been drastically pruned, and the labour force greatly reduced to meet the crisis. What exactly has this policy of economy entailed?

In the first place the labour force has gradually been whittled down from 2,350 in 1953 to a present figure of about 900. Last year alone, 570 labourers were laid off with corresponding reductions in European and Asian staff. Finding new employment for these people is also proving a problem. Although the State government has helped to establish them away from Batu Arang, results have been disappointing as many of these people seem very reluctant to leave the property, where they have lived and worked for many years.

In the second place, two underground mines have been

A view of one of the main incline conveyor belts, 207 yards long at a gradient of 1 in 6.3, for carrying coal from the opencast site

closed and work concentrated on the less expensive open-cast method. A third underground mine is still being worked, and the company intends to continue operating it providing costs can be maintained at a competitive figure.

Last year's output of saleable coal amounted to 224,756 tons—13,996 tons less than for the previous year. This fall is due to consumers turning to other types of fuel. Present sales are about 6,000 tons a month to power stations, 3,500 each to tin dredges and Malayan Cement Ltd., which is associated with the coal company. The balance goes to Malayan Railways and miscellaneous small users. The market, however, is likely to dwindle

Yet despite the rather grim outlook, the company's policy of cutting its coat according to its cloth is working reasonably well, and there was an encouraging profit last year of $866,000 (Malayan), compared with a deficit the year before of $221,571 (Malayan). Moreover, limited sales were maintained at a fairly constant level, and in some cases there were even slight trading improvements. But few will deny that in the long run demands for coal are likely to become less and less. Admittedly, sales efforts are being made to counteract the drop in business, and executives of the company are optimistic that the mine will operate at a small profit for some time to come.

The prospects of discovering high-grade coal in Malaya are extremely small. On the other hand if the coal now being mined could be exported most of the firm's problems would be solved. But the highly inflammable nature of the coal makes this impossible. The company therefore, has no alternative to supplying a slowly dwindling home market. It is a stalemate which can lead to only one conclusion : that the days of Malaya's small, though efficient, coal industry are numbered.

Another view of the main incline conveyor showing the structure of the 300 ft. long underground stretch

Mercury in 1955

Drastic reductions in U.S. imports and rising world production were outstanding features of the mercury industry in 1955, according to a report prepared by the Branch of Base Metals, Division of Minerals, U.S. Bureau of Mines.

World production of mercury rose for the seventh successive year and totalled 196,000 flasks—the highest annual rate since 1943. The increased production resulted largely from the Mexican output, which more than doubled, as the accompanying table shows. Small gains were made in Spain, U.S. and Yugoslavia, whereas production in Italy decreased slightly. Production was reported for the first time in the Philippines. Increases were recorded in Chile and Turkey, while the Japanese output dropped.

U.S. consumption of mercury in 1955 rose 34 per cent over the preceding year and totalled 57,200 flasks. The increase was accounted for mainly by the installation of a new chlorine and caustic soda plant using mercury cells at Muscle Shoals, Ala. The average annual price of $290.35 a flask exceeded the previous peak established in 1954 by $25.96 a flask. Quotations ranged from $323-$325 a flask in March to $253-$255 in August (current quotations are $255-$257).

Imports of mercury into the U.S. fell sharply in the last quarter of 1954 and continued at the reduced rate in 1955. As a result, the year's total imports of 20,648 flasks were the smallest since 1947 and 68 per cent lower than those in 1954.

U.S. domestic mine production continued the upward trend of the last five years and rose 2 per cent over that of 1954 to 18,955 flasks. Of the total production, 94 per cent was obtained from 18 mines.

Inventories fell below normal levels and totalled only 10,028 flasks at the end of the year, compared with 22,486 flasks at the beginning.

Government actions initiated in 1954 to strengthen the current and future supply situation in the U.S. were continued in 1955. These consisted of exploration assistance by the Defence Minerals Exploration Administration and the guaranteed-price programme of the General Services Administration.

Mercury consumed in the U.S., 1954-55, in flasks of 76 lb. was as follows :

Use	1954	1955
Pharmaceuticals	1,846	1,578
Dental preparations	1,409	1,177
Fulminate for munitions and blasting caps	106	90
Agriculture (includes insecticides, fungicides, and bactericides for industrial purposes)	7,651	7,399
Anti-fouling paint	512	724
Electrolytic preparation of chlorine and caustic soda	2,137	3,108
Catalysts	594	729
Electrical apparatus	10,833	9,268
Industrial and control instruments	5,185	5,628
Amalgamation	203	217
General laboratory	1,129	976
Redistilled	9,281	9,583
Other	1,910	16,708
Total	42,796	57,185

WORLD PRODUCTION
(per flask of 76 lb.)

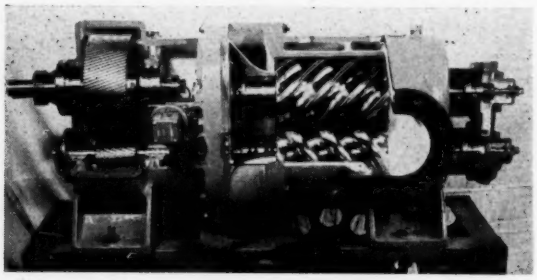
Country*	1954	1955
North America :		
Mexico	14,755	29,878
United States	18,543	18,955
South America :		
Chile	243	526
Peru	77	—
Europe :		
Austria	27	16
Italy	54,477	53,520
Spain	43,135	45,000
Yugoslavia	14,446	14,591
Asia :		
Japan	10,269	4,968
Philippines	—	635
Taiwan	44	—
Turkey	261	841
Total (est.)	182,000	196,000

* Rumania and a few other countries may also produce

The Scope for Rotary Compressors Underground

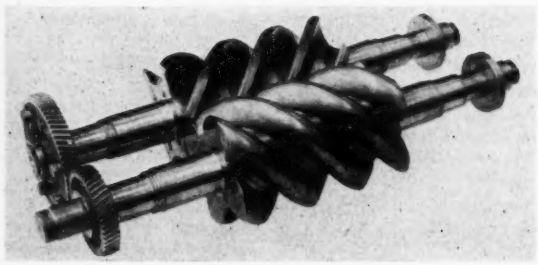
With few exceptions compressed air is universally employed for both surface and underground duties in the mining industry to-day, and has proved to be an efficient and conveniently handled form of power which may be adapted to meet increasing demands due to greater mechanization. This trend is, perhaps, most apparent underground where pneumatic operation is applied to a wide range of coal-mining appliances. It is in such a field, in particular, that the characteristics of the modern rotary compressor prove advantageous in meeting the exacting demands of the industry.

Preference, for the supply of compressed air underground, has in many cases been afforded to the surface unit, due to the large capacity of the machines involved, and the reliability assured by maintenance and servicing facilities. It is apparent, however, that the operation of a surface compressor station entails long supply lines with their attendant friction and wastage losses during transmission to the working faces underground. Since compressed air is a comparatively expensive commodity, substantial savings may be effected by the installation of smaller compressors underground, which would also provide a much greater degree of flexibility. This system is, in fact, employed with success in many pits employing mainly reciprocating compressors which give, in general, satisfactory service, but it is considered that many of the disadvantages associated with this type of machine could effectively be overcome by the introduction of the rotary compressor which is simple in principle, compact, and devoid of the complexity of valves, springs and piston rings. It is significant in this connection that several of the large compressor manufacturers are actively developing rotary compressors in one form or another, and there seems little doubt, especially in the case of the large portable or semi-portable compressor, that those of rotary design will eventually replace the reciprocating machine.



View of a sectional 200 mm. compressor

An interesting compressor in this field is the positive displacement lobe machine developed originally in Sweden as the "Lysholm" compressor for gas turbine air supply. In view of its stable characteristics it soon became evident that this would prove suitable for a much wider range of applications. All further work was therefore directed towards producing a machine for industrial duties in Sweden and later in Great Britain. In 1946 a licence for its manufacture was obtained from Svenska Rotor Maskiner by the Glasgow firm of James Howden and Company Ltd. Since then progressive improvements have been made in design and performance, leading to a standard series of compressors now in production which cover a capacity range from 400 c.f.m. to just over 8,500 c.f.m. at pressures up to 60 p.s.i.g. in one stage, or up to 150 p.s.i.g. in matched two-stage units.

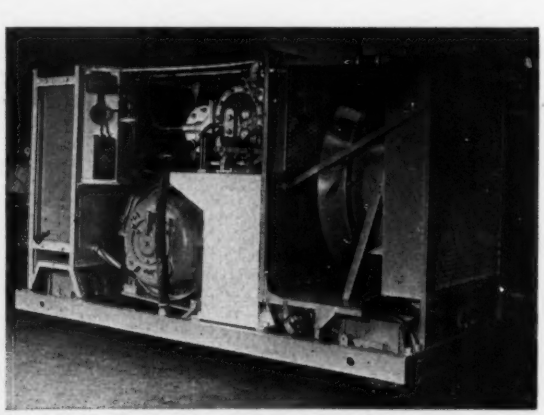


Two typical rotors in mesh

The operating principle of this compressor consists essentially of two helically lobed rotors or screws which mesh together in a close fitting main casing incorporating specially shaped inlet and outlet ports, respectively at either end. As the rotors revolve, air is drawn in by the depression created as unmeshing occurs; the air is then trapped between rotor lobes and casing as they further rotate. When re-meshing of the filled lobes takes place on the opposite side the trapped air is progressively compressed and discharged through the outlet port. The shape and size of this outlet port governs the point at which the air is discharged and hence the degree of compression achieved. The rotors are maintained in correct relationship to one another by helical "timing" gears keyed to the rotor stub shafts and, as fine clearances exist between rotor lobes and casing bores, no rubing contact exists.

It will be noted that the discharge air cannot be contaminated by oil vapour, a feature which combined with the absence of internal rubbing parts ensures maintained efficiency and the ability to operate safely and without harm in dust laden atmospheres. Thus, with these advantages and the inherent stable pressure column, characteristics of a positive displacement rotary compressor the manufacturers envisage several applications which may prove of particular interest to the mining industry and much development work to this end is at present being carried out by the company.

The accompanying photographs of rotary compressors and components are published by courtesy of James Howden and Company Ltd.



Trolley-mounted air boosters for South African mines (side covers removed)

URANIUM RECOVERY—III

Recovery Methods Applied to Uranium Ore

The technique of acid pressure leaching in uranium recovery provides one method by which reagent consumption may be reduced, and thus the practice is of particular interest to treatment plants situated in remote regions. The following article, the concluding instalment of three describing the recovery of uranium by ion exchange, discusses acid pressure leaching with particular emphasis on the conditions existing in Australia and India.

While the ex-works price of the principal reagents used in acid leaching—sulphuric acid and the deoxidant—may not be excessively high, the price at a uranium treatment plant in a remote locality may be several times higher. This sort of problem applies, for example, to Australia, where distances are great and transport often costly. Consideration has therefore been given to methods of reducing reagent consumption. The technique of acid pressure leaching provides one way in which reagent consumption may be reduced. The leaching of Australian ores by the acid pressure method was the subject of a paper presented at the Geneva Conference on behalf of the Division of Industrial Chemistry, Commonwealth Scientific and Industrial Research Organization.[3]

It has been shown in the U.S. that sulphide minerals can be oxidized in an aqueous suspension with compressed oxygen at temperatures above about 130 deg. C. fast enough to make this an economic proposition for producing soluble sulphates. Ferrous sulphate, for example, produced in this manner can be oxidized a step further to ferric sulphate, which, by hydrolysis, breaks down into an insoluble basic iron compound and sulphuric acid. In ores where iron sulphides are associated with uranium minerals these reactions can be utilized to generate sulphuric acid *in situ* for leaching the uranium. In favourable circumstances no acid or chemical oxidant need be added to the leaching vessel, the only reagents required being water and oxygen under pressure.

OTHER ASPECTS OF THE PROCESS

Acid pressure leaching is also a possible method of reducing reagent consumption in treating ores containing refractory uranium minerals. Minerals which break down only slowly with relatively strong acid under atmospheric conditions may, in some cases, be leached with less acid and in shorter time if digestion is carried out at a temperature of, say, 150 deg. C. or more.

The ore samples used in the investigation were representative of both these types of uranium ore. The ore from Rum Jungle in Northern Territory contains uraninite associated with iron and copper sulphides and a siliceous slaty gangue and is ideally suited for investigation of *in situ* acid generation. At Radium Hill, the uranium mineral, davidite, is a complex uranium-rare-earths-iron-titanate, which requires relatively strong acid to effect decomposition at atmospheric pressure.

Preliminary investigations were carried out on a small laboratory scale in batch type operation. The main purpose of the tests on Rum Jungle ore was to discover whether enough acid could be generated *in situ* to get uranium extractions comparable with those obtainable under atmospheric conditions. To substantiate the results obtained from the initial work, a larger unit treating a continuous ore stream was designed and operated. In this reactor Jungle ore has been treated so that more than 95 per cent of the uranium was leached in a retention time of only 50 min. at 180 deg. C. and an oxygen partial pressure of 40 p.s.i. (total working pressure about 370 p.s.i.g.). These results are regarded as very encouraging.

Radium Hill ore is amenable to physical concentration, but the composition of davidite precludes the preparation of a concentrate sufficiently rich in uranium. In devising a new method of leaching this concentrate, two specific requirements are a means of reducing acid consumption and a means of producing a liquor containing less iron and titanium, which may be particularly troublesome during subsequent treatment. The best uranium extractions in the tests under review were as good as, or better, than those obtained in non-pressure leaching using only a third as much acid and in less time. Furthermore, the titanium and soluble iron concentrations were greatly reduced.

RECOVERY FROM CARBONATE LEACH SOLUTIONS

An ion exchange process for the recovery and concentration of uranium from diluted solutions containing free sodium carbonate were described at the Geneva Conference by members of the Atomic Energy Establishment, Trombay, India.[4]

The alkaline leaching process employs sodium carbonate solution, which extracts the uranium as the uranyl carbonate complex $Na_4 [UO_2 (CO_3)_3]$. The commercial success of this process depends on an efficient method of recovering uranium completely and economically from the leach solutions and re-cycling the barren liquors. The conventional method of recovering uranium by precipitation with sodium hydroxide works well when the uranium concentration in the leach solution is of the order of 2.5 g/l. In the case of more dilute solutions (obtained from low grade ores), the recovery of uranium was low and the reagent consumption high. In view of the relative simplicity of operation, the caustic precipitation method has been widely used. In order to recover uranium from very dilute leach solutions, preconcentration is necessary to bring the uranium content up to more than 2.5 g/l.

An investigation was undertaken by the Atomic Energy Establishment at Trombay to find out whether an anionic exchange method could be developed for concentrating uranium from dilute solutions. A strongly basic resin, Amberlite IRA-400 was employed. The preliminary data were collected using solutions made from pure chemicals, the results being confirmed with leach solutions obtained from a low grade uraniferous ore. It was found that the uranium uptake was dependent on the feed composition. A 1 OM sodium nitrate solution containing sodium carbonate was used for eluting the uranium from the resin bed and the concentration of uranium in the eluate was of the order of 25 g/l.

During the absorption of uranium from a 5 per cent Na_2CO_3 solution, certain anions such as vanadate, phosphate, aluminate, etc., which are likely to be present in the plant leach liquors, passed out in the effluent. The recovery and purification of uranium from nitrate eluate could be achieved by ether extraction of uranyl nitrate.

The following advantages are claimed for this method of recovering uranium ore :

(1) the effluent from the process can be re-cycled for contacting fresh ore;

(2) in the absorption stage uranium is freed from impurities such as phosphate, vanadate, etc.;

(3) sodium nitrate used for elution serves as a salting out agent in solvent extraction process and the raffinate, after adjusting the composition, can be used a second time.

Further approaches to the problem of separating uranium from its ores have been described in a previous work.[1]

TECHNIQUES UNDER DEVELOPMENT

A modification of the ion exchange technique, to eliminate the requirement that feed to the resin must be water clear, has been developed for use on ores that have difficult thickening characteristics.

This is a fluidized-bed ion-exchange technique known as resin-in-pulp. The chemical characteristics of the resin used are the same as those for the resins used in columns, but the particle size is considerably larger. These larger particles of resin are placed in a perforated stainless-steel basket, which has openings smaller than the resin beads, but larger than the particles in the pulp fed to the process. The acid leach liquor from the digestion tank first passes through the sand-slime separation to remove the coarse sands. The desanded pulp is then fed into a series of cells containing baskets partially filled with the ion exchange resin. The baskets are operated by an overhead drive, which slowly moves them up and down in the solution. By this means the resin beads are kept in motion while suspended in the pulp. The barren pulp from the process may be discarded, thus eliminating a costly and difficult solid-in-liquid separation step. The uranium-loaded resins are then eluted in a manner chemically the same as for resins in columns. This process will be employed in a number of plants now under construction. A technique is also being developed for using resin-in-pulp to recover uranium from alkaline solutions.

Another technique for the recovery of uranium from solutions utilizes organic solvents. To date, use of this method has been confined to acid solutions. The U.S. Atomic Energy Commission has plants under construction and in operation which use it to recover uranium from phosphoric acid. In addition, development work has progressed through the pilot-plant stage on the application of this method to ores from the Colorado Plateau.

CONTINUED RESEARCH

Research organizations in the U.S., the U.K. and the Dominions are still devoting much attention both to the development of new or improved recovery methods and to the particular problems presented by individual ores. The Chemical Research Laboratory at Teddington, which has made outstanding contributions to mineralogical chemistry, continues to be prominently associated with progress in uranium technology. Problems which arise in the Dominions when processes are put into operation on a commercial scale are frequently referred to Teddington. Resin manufacturers are continually striving to develop ion exchange resins of greater absorption capacity.

On the research side, the Chemical Research Laboratory is studying the resin-in-pulp technique previously described, one of the aspects in which it is interested being the possibility of developing a continuous process of ion exchange based on the principle of the endless belt. The use of selective membrane cells in place of ion exchange columns is also being examined.

REFERENCES

(1) *Recovery of Uranium from its Ores*, by G. Marvin, T. Upchurch, E. Greenleaf, E. Van Blarcom and A. Morphew.
(2) *Acid Pressure Leaching of Uranium Ores*, by P. M. J. Gray.
(4) *An Ion Exchange Process for the Recovery of Uranium from Carbonate Leach Solutions*, by Jagdish Shanker, D. V. Bhatnagar and T. K. S. Murthy.

Airborne Survey at Tennant Creek, Australia

The Australian Minister for National Development, Senator the Hon. W. H. Spooner, recently stated that the Bureau of Mineral Resources of that Department will shortly extend its airborne surveys to areas in the central part of the Northern Territory where airborne surveys have not previously been made. These surveys will be made with DC 3 aircraft fitted with the latest magnetometer and scintillograph equipment.

The area of principal interest is the Tennant Creek mining field, which has already produced gold and copper ore. An area of 2,500 sq. miles around Tennant Creek will be surveyed in about 10 weeks. This area will include all the existing mines in the Tennant Creek field,

The Tennant Creek field was opened up because of the gold deposits existing there. In testing the magnetic anomalies it was found in 1937 at the Peko that the body giving rise to one anomaly consisted of magnetic and copper minerals. This body was not tested further until 1950 when a drill hole intersected copper-gold ore; the Peko Company is at present working this orebody. Other intersections of copper ore have been made and some resulted from the testing of other magnetic anomalies. The surveys will form part of the general search for uranium deposits.

Surveys of a less detailed reconnaissance type will be made over two other regions south-east of Tennant Creek. One is an area of about 5,500 miles in the Davenport Range region, including Mosquito Creek, and the other is an area of about 3,500 miles in the Jervois Range region.

Perlite Mining in the United States

Little information has been published describing the perlite resources of the United States. Much field work needs to be completed before workable deposits of the mineral can be located, and more exploratory work is necessary before a reasonable estimate of reserves can be given.

According to *Geological Survey Bulletin* 1027-1, however, a few operating companies have published estimated reserve figures. Sixteen deposits have been examined in Nevada and Utah, and are estimated to contain total reserves of more than 4,000,000 tons of suitable quality material. In the vicinity of Caselton, three other mines presumably have many millions of tons of perlite in reserve, the Grant Mine alone being reputed to contain more than 14,000,000 tons.

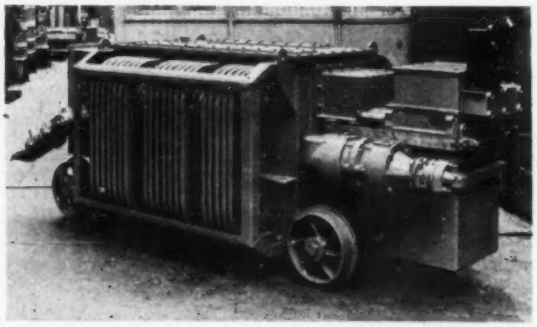
The reserves of the Rosita district, Colorado, are reported to total 20,000,000 tons, while in the mountain ranges south west of Socorro, New Mexico, a deposit of perlite is said to contain "many millions of tons". Deposits at Grant County, in the same State, are estimated to contain approximately 2,000,000 tons of high grade ore. Two deposits near St. Helena, California, are reported to contain approximately 130,000,000 tons.

Commercial perlite deposits in the U.S. are on or close to the surface and consequently open pit methods of exploitation are generally employed. Mining is simple and inexpensive, with the disposal of overburden and difficulties of transportation standing as the major problems. Milling centres upon the comminution of the rock to the desired screen size, both wet and dry processes being used.

MACHINERY AND EQUIPMENT

A Range of Mining Type Transformers

A number of transformers manufactured by C. A. Parsons and Co. Ltd., are to be installed underground in a colliery in Nova Scotia, Canada. Each transformer has a rating of 400 KVA and is suitable for operation on a 6600/2200-550 volts, 3 phase, 60 cycles system. Off-circuit tappings of minus 10 per cent in four steps of 2½ per cent are provided on the high



The H.V. end of a 400 KVA Parsons mining type transformer

voltage side, and the alternative voltages on the low voltage side are obtained by means of a linking arrangement, accessible through inspection openings in the tank cover.

A circuit breaker, incorporating overload and earth fault protection and equipped with flit plug is mounted on the 6600 volt end of the transformer, and due to the large currrent when operating on 550 volts, the L.V. air-filled chamber is provided with two flit plugs. The flanged rollers are suitable for operating on a 30-inch rail gauge.

A Large-Scale Crusher

A Pegson, 30 in. by 42 in. single toggle roller bearing crusher has now been in operation in a Gloucestershire limestone quarry for approximately six months. The machine, manufactured by Pegson Ltd., is believed to be the largest ever produced in the United Kingdom with an all-steel welded construction one-piece body.

The Pegson 30 in. by 42 in. single toggle roller bearing crusher

The crusher has a capacity of approximately 100 tons per hr. at 4 in. discharge setting, up to 150 tons per hr. at 6 in. discharge setting, weighs 26 tons and requires 70/100 h.p.

A Scraper Packing System

With relation to scraper packing, The Slusher Type N221, manufactured by Joy-Sullivan Ltd., together with associated scraper buckets, is the subject of an interesting brochure recently published by the manufacturers. It has a rope speed of 223ft./min. or 289 ft./min. according to motor capacity and a rope pull of 650 ft. of ½ dia. or 450 ft. of ⅝ dia. rope. Three types of bucket are in general use.

Remote Control Measurement of Shaft Inclinations

With the introduction of the Maihak Inclinometer, expensive passages or control shafts are no longer necessary and are claimed as a relic of the past.

The Maihak inclinometer receiving unit

The Inclinometer, introduced into the United Kingdom by Smail Sons and Co. Ltd., is a precision instrument for the remote control measurement of inclinations in horizontal or vertical planes, for concrete construction, steel construction, mine and shaft sinking.

With this Maihak remote control system the measured values are transmitted with constant and reliable accuracy, from any distance to the receiving unit, thus making it possible to cover from one central point, any number of points of measurement, even at the most inaccessible places.

Tractor Push Loads U.S. Stockpile

A new machine—the world's largest tractor equipped with a special 20 ft. U blade is moving impressive tonnages of coal on the stock pile of the B.C. Cobb Plant of Consumers Power Co., U.S.A. Tests show that the big crawler—a Caterpillar D9 tractor equipped with a Balderson BD9U-20 ft. materials handling blade—can push an average load of 19-20 tons.

MINING MISCELLANY

A report from Turkey states that substantial iron ore deposits have been discovered near Bergama (Izmir).

* * *

Two new brown coal workings are to be brought into production at Soby in Jutland, Denmark, and are expected to produce 600-700 tons daily.

* * *

Pakistan Industries Ltd. hope to have an antimony smelting plant in operation at Klinge near Chitral town by June, 1957.

* * *

Some 40 applications have been received by the Ministry of Commerce in Sweden from firms and indivuals requesting permission to seek and exploit findings of uranium and beryllium in the country.

* * *

Consolidated Mining and Smelting Company of Canada, which is controlled by the Canadian Pacific Railway Company, has resumed exploration in Eastern Canada after an absence of several years.

* * *

Altos Hornos de Mexico, S.A., one of Mexico's leading steel producers, has acquired the La Perla iron ore deposits at Camargo in the State of Chihuahua. They intend to supply two of their furnaces with ore from this mine.

* * *

The U.S.S.R. Ministry of the Coal Industry has awarded the title of "Honoured Miner" to 2,500 workers, all of whom have worked for 10 or more years in the pits and have achieved outstanding results.

* * *

During 1955 Goa exported 1,522,752 tons of iron ore, of which 1,020,091 tons were sent to Europe and the balance to Japan. Exports of manganese ore during 1955 totalled 163,392 tons, of which 4,498 were sent to the U.S.

* * *

The Egyptian Ministry of Industry has received numerous applications from domestic and foreign firms to carry out prospecting work in the various desert areas of the country for manganese, copper, iron, chrome, asbestos and other minerals.

* * *

The establishment of a steel mill near Multan, in West Pakistan, is now well under way. Sponsored by the Pakistan Industrial Development Corporation in co-operation with Krupps, the mill in its final shape will produce about 500,000 tons annually.

* * *

The Rhodesian Territorial Parliament has passed a motion referring the question of a rail link between the Federation and the West Coast to the Inter-Governmental Planning Group for its consideration and recommendations. It is claimed that the proposed rail link would provide an economic outlet for coal exports to the U.K. and Europe.

* * *

The Grängesberg Co., of Sweden, is planning to establish a steel works adjacent to the Oxelösund ironworks which it recently acquired. Construction, estimated to cost about kr.200,000,000 would be financed from the sum Grängesberg is to receive from the Government for the purchase of its holdings in the Luossavaara-Kirunavaara Mining Co.

* * *

The Ministry of Mines, Venezuela, states that, despite many misleading reports to the contrary, exploration for uranium in Venezuela is only in its preliminary stages and no important discovery has yet been made. Should uranium be found in commercial quantities, the Government's policy will be not to grant concessions but to undertake exploitation itself.

* * *

Approval of a request for $6,000,000 additional borrowing authority to finance essential projects during the fiscal year, 1957, under the Defence Minerals Exploration Administration programme, has been granted by the U.S. Office of Defence Mobilization. This brings the total of funds authorized by O.D.M. for the programme to $34,000,000.

* * *

A considerable tonnage of low-grade lead ore has been discovered by diamond drilling near Rum Jungle in the Northern Territory. Mr. F. S. Anderson, a director of Consolidated Zinc Proprietary, said that extensive drilling and pinpointed a low-grade ore-body, but no high-grade ore had been found. Much more prospecting would be necessary before a quantity suitable for commercial production could be proved.

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Under the international barter programme, the U.S. national stockpile during the first half of 1956 received $1,000,000 worth of aluminium powder purchased from Austria, $5,700,000 worth of tungsten from Argentina, and $2,800,000 worth of rare earths from Brazil. Arrangements were entered into with Indonesia for earmarking $2,000,000 in local currency for the purchase of other strategic materials from that nation.

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A report from Melbourne states that Metal Traders Ltd., of London, has decided to exercise an option to take over 120,000 5s. shares in Titanium Minerals Ltd. at par. Of these 60,000 shares will be taken up immediately and 60,000 within three months. The 120,000 shares are half of the full option over 240,000 shares at par held by Metal Traders until October 10, 1956. Proceeds of the issue will help to finance a second treatment plant near Woodburn, which should come into operation next year.

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Frobisher's new mine in Uganda, operated by Kilembe Copper Cobalt Ltd., is reported to be making satisfactory progress towards scheduled production. The concentrating mill is already handling 1,100 tons daily, which is not far short of its rated capacity of 1,335 tons. The concentrates are carried eight miles through a pipeline, entirely by gravity, to the roast-leach plant at Kasese. The calcines will be taken by rail to the smelter at Jinja, which is scheduled for operation in October. The output of the hydroelectric plant is reported to exceed the anticipated figure.

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An application for an exclusive prospecting reservation to seek tungsten in an area of 23 sq. miles in the Eastern Districts of Southern Rhodesia has been made to the Southern Rhodesia Department of Mines by the Rhodesian Selection Trust Exploration, Ltd. The area is between the Sabi River and Odzi, not far from Umtali. Southern Rhodesia's present output of tungsten is small. During the first six months of this year slightly under 130 tons of scheelite concentrates, worth about £79,000, were produced.

* * *

El Sol Gold Mines Ltd. has optioned what company officials describe as a large and intriguing iron prospect in north-western Ontario from the discoverers, Newkirk Mining Corporation Ltd. The property was staked following an airborne geophysical survey which outlined an "off scale" anomaly of large proportions. The part of the anomaly that was completely off scale measured 2½ miles long by one-half mile wide. A preliminary dip needle survey made on the ground indicated numerous outcrops of iron formation carrying a high percentage of magnetite. These showings are to be sampled.

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Broken Hill Pty. Ltd. has announced an expansion programme involving £A100,000,000 to be carried out in the next five years. The chairman, Mr. C. Y. Syme, told the company's annual meeting that most of the expansion would take place at Port Kembla, in South Australia, where major furnaces to provide additional steel were already under construction. Others were planned. The new estimate supersedes the £A67,000,000 expansion plan announced in March last year. Mr. Syme said that in the next 12 months the money borrowed by the combine would rise from £A6,000,000 to £A10,000,000. He also announced that a new £A6,000,000 share issue at par would be made after the current contributing capital had become fully paid.

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The French State-owned Coal Mine Corporation has announced the discovery of a deposit estimated at 250,000,000 tonnes near the Swiss border. This is the biggest find since nationalization at the end of the second world war. The Corporation said it would not decide whether to work the mine until next year. If shafts were sunk production could begin in about five years and ensure employment for 5,000 colliery workers until the end of the century.

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The 1955-56 annual reports of the Mineworkers' Pension and Industrial Injury Supplementary Schemes show that Ministerial authority has been given for these schemes to increase the maximum percentage holdings of their investments in Preference and Ordinary shares from 25 to 30 per cent of the total fund. The management committees of both schemes have decided to take advantage of this authorization. Membership of the Pension Scheme (which is voluntary) is 81.2 per cent of eligible mineworkers, compared with 79.1 in each of the two previous years. During the year members contributed £1,784,703 and the employers £4,584,038. The Fund continues to grow and at April 5 stood at £27,340,588 compared with £21,696,310 a year earlier.

A U.K. heavy engineering mission, under the chairmanship of Sir Eric Coates, will be visiting India in October to advise on the further extension of heavy machinery manufacturing capacity during the period of the Second Five-Year Plan. The Mission, which will include representatives of the British heavy engineering industry, has been formed under the joint auspices of the Federation of British Industries and the Colombo Plan. Preliminary work of an exploratory nature is to be undertaken by an advance party of three experts, who were expected in New Delhi at the end of August. They are: Mr. R. Arbuthnott, managing director of the North British Locomotive Co., Ltd.; Mr. W. G. Carter, a partner in W. S. Atkins and Partners, and Mr. Douglas J. Stitt, director of the Steel Works Plant Association.

* * *

Patterson caplamps and flame lamps are now available throughout the British Isles. This is a result of the recent acquisition by Alkaline Batteries Ltd., of Redditch, Worcs., of all the share capital of Patterson Lamps (1953) Ltd., of Gateshead-on-Tyne. The sales and technical staff of Alkaline Batteries, makers of Nife nickel cadmium alkaline batteries and miners' lamps will now join forces with the Patterson staff and work as one unit, selling all types of lamps. The Patterson company is well-known for its self-service caplamp of the lead acid type. Enquiries should be addressed to Patterson Lamps (1953) Ltd., Second Avenue, Team Valley, Gateshead-on-Tyne 11.

PERSONAL

Lord Baillieu, Mr. Robert Walker and Mr. T. Muir Warden have resigned their offices as directors of the Trinidad Oil Company. Mr. R. H. Aitken, Mr. A. W. Baucum and Mr. K. O. G. Huntley have been appointed directors.

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The Board of Eastern Transvaal Consolidated Mines has been reconstituted and now consists of Mr. L. P. Kent (chairman), Mr. A. Gray, Mr. B. E. Hersov, Mr. L. W. Luttrell-West, Mr. J. D. Mackenzie, Mr. S. G. Menell, Mr. S. J. N. Maisels and Major-General R. J. Palmer.

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The National Coal Board have appointed Mr. R. S. McLaren, D.S.O., M.B.E., general manager of No. 3 (South East) Area of its Durham Division, to be production director of that Division. He succeeds Mr. H. E. Collins, C.B.E., who, in July, was appointed Director-General of Reconstruction at National Headquarters.

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Mr. H. W. Stainton, who retired recently from Metropolitan-Vickers Electrical Co. Ltd., had completed 41 years' service with the company. With his previous experience this amounted to 52 years in engineering.

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Mr. Foster M. Stewart has become managing director of the North British Rubber Company. Mr. G. R. McNear, who has been managing director since 1950, is remaining for some time with the company as a director in an advisory and consultant capacity. Mr. McNear will return to the U.S. to take up an executive post with the United States Rubber Company as from January 1 next year. Mr. Stewart was loaned by United States Rubber, the main stock holders of North British Rubber, for a period of 10 months last year, to co-ordinate planning for the modernization of the U.K. company's plant. He has been acting as assistant to the managing director for the past four months.

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Mr. Henry A. Saller, one of the leading U.S. authorities on materials used in the construction of atomic reactors, has been appointed an assistant technical director at the Batelle Institute, Colombus, Ohio.

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Mr. Marling J. Ankeny recently took his oath of office as director of the U.S. Bureau of Mines.

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Mr. C. J. O. Garrard has been appointed manager of the General Electric Co.'s Switchgear and Transformer Works Group at Witton. Mr. J. S. Cliff has been appointed manager of the switchgear works at Witton.

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The National Coal Board has appointed Mr. E. J. Davies, deputy marketing director of its South-Western Division, to succeed the late Mr. P. R. Evans as divisional marketing director.

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A new Public Relations company, Galitzine and Partners Ltd., has been formed to take over the contracts and staff of Galitzine and Partners. The directors are Prince Yurka Galitzine, S. W. Chant, O.B.E., M.C., and Sir Lindores Leslie, Bart., who will be the company secretary. Prince Galitzine is London Public Relations representative for the Rhodesian Selection Trust Group.

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Rapid Magnetic Machines Ltd., of Lombard Street, Birmingham 12, announce the establishment of a department specializing in automation and magnetic powers.

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Simon-Carves Ltd. have moved from their former London branch offices in Stratton Street into a new and much larger Simon House at 28-29 Dover Street. This has enabled them to bring under one roof, in greatly improved working conditions, their own London staff and the staff of their subsidiary, Huntington, Heberlein and Co. Ltd., who have abandoned their premises in Cromwell Road. Simon House is also used as a London office by Simon Handling Engineers Ltd. and Henry Simon Ltd., though neither of these companies maintains a resident London staff. The telephone number of Simon House (all sections) is Hyde Park 8191 and the Telex number is 2-3165.

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The U.K. Atomic Energy Authority is to hold a conference at Harwell on November 30 at which its programme of research on advanced types of nuclear power reactor systems will be explained to representatives of British industry. Details of the conference and the information scheme are obtainable from the Industrial Collaboration Office, Atomic Energy Research Establishment, Harwell, Berks.

* * *

The U.S. Bureau of Mines has analyzed the factors in current and future mineral supplies and has assessed the national position and problems for 85 specific commodities. These surveys have been published as Bulletin 556 under the title of "Mineral Facts and Problems". This encyclopedia of information on mineral commodities is obtainable from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. Price $5.75.

* * *

The Mond Magazine No. 1, July, 1956, contains illustrated articles and metals on many subjects, ranging from palladium to stained glass windows and steering rod assemblies. The aim of this new publication is to provide interesting articles and notes on subjects related to all products of Mond and their associates in Canada. Future issues will contain articles on the uses of nickel, copper, cobalt, gold, silver, the platinum metals, selenium, tellurium, sulphur and iron ore. Copies are obtainable from the Mond Nickel Co. Ltd., Publicity Department, Thames House, Millbank, London, S.W.1.

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The National Coal Board's 10th annual summer school, which will be held at Oxford from September 8-15, will be attended by some 500 students from all the British coalfields, including 80 colliery workers. The opening lecture by Mr. J. Latham, C.B.E., Deputy Chairman of the N.C.B., will have for its subject "The Challenge of Technical Change". The closing address, entitled "Mining in Russia To-day," will be given by Dr. W. Reid, Board Member for Production, who recently led a technical mission to the Russian coalfields.

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Courses in export practice, finance, law and marine insurance will be held at City of London College, Moorgate, E.C.2, on Saturday mornings from 10 a.m. to 12.30 p.m., beginning on September 30, 1956.

CONTRACTS AND TENDERS

The biggest contract still outstanding for the Kariba Gorge hydro-electric power scheme has been awarded to the British Thomson-Houston Export Co. It comprises 330 kW switchgear and associated equipment to a total value of £2,121,141. This is one of the largest orders ever placed with a British firm and is among the first orders placed in Britain for 330 kV switchgear. Eleven tenders were received. A contract worth £36,157 has been awarded to A. Reyrolle and Co. for the supply and installation of switchgear at 11 kV and 380 v. With the exception of the transmission lines, the whole of the electrical equipment at Kariba will be of British manufacture. Much of it will come from the A.E.I. group, of which B.T.H. is a member.

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The Fraser and Chalmers Engineering Works of the General Electric Co. has received contracts worth about £200,000 from Forges de la Providence S.A., of Marchienne-au-Pont, Belgium, for ore-blending, crushing, screening and sampling equipment.

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The Swiss firm, Braun Poveri, has won the contract for construction of a 70,000 kW thermo-electric plant at Ptolemais in West Macedonia, worth just over $8,400,000.

METALS, MINERALS AND ALLOYS

COPPER.—Much of the steam has been taken out of the Suez crisis during the past week. Not that anybody has been given any news of substance to take a hopeful view of the outcome of the discussions between the Menzies Committee and Colonel Nasser, but it was enough for the Australian Premier to say that talks were proceeding "satisfactorily" to crystallize beliefs that a shooting war was now out of the question and that, although negotiations may be protracted, a reasonably happy solution to the problem would be found.

The lessening of the tension generated by the situation at Suez over the past month does not go very far, however, in clarifying the various other major factors affecting this market.

Generally speaking, the outlook is bullish. In the United States the first of the new 1957 model cars and trucks have been put on display and the trade there is optimistic about the demand for copper rapidly expanding. With other car manufacturers expecting to introduce their new models within the next few weeks, the fact that operations at the Garfield refinery are still continuing (without the new labour contract having been negotiated) has not been interpreted bearishly. Latest advices indicate that some progress has been made but that the main stumbling block to completing the negotiations remains the cost of living provision, which the Steelworkers' Union wants included in the new contract, which is not written into the non-ferrous contracts concluded by the Mine-Mill Union.

Continued labour unrest in Northern Rhodesia has brought the copper mining industry almost to a standstill. The real issues and purposes behind this dispute have yet to emerge clearly.

In the meantime, copper continued quiet both here and in New York with the undertone firm. U.S. producers are still quoting 40 c., custom smelters 39 c. with dealers offering at 38 c. - 38.50 c. per lb. Scrap copper reflected the brisker activity and is now quoted a ½ c. higher at 32½ c. per lb., though at this price business is at a low ebb.

LEAD.—While the lead market has been relatively idle this week in London and New York this temporary falling away of demand is not indicative of a new trend. In the U.K. supply and demand appears to be roughly in balance and now that the holiday season is over it is expected that consumer demand will return to higher levels. In the U.S.A. battery manufacturers, who absorb about one-third of the annual consumption of lead, used 178,030 tons in the first six months of 1956 against 168,667 tons in the first half of 1955. During the same period the offtake of lead by cable makers increased to 69,376 tons from 59,975 tons while consumption of tetraethyl lead rose to 95,797 tons compared with 80,065 tons. There are not many bears about in this market. It is believed that only token amounts of lead were offered to the G.S.A. last month.

TIN.—Tin is quiet but firm on both sides of the Atlantic, and the steadiness of the price reflects an appreciation of the metal's sound statistical position. In the United States, where demand for spot supplies has recently shown some improvement, consumption of primary tin during the first six months of this year totalled 31,400 tons, an increase of 5 per cent or 1,400 tons over the same period a year ago. The tinplate industry both here and overseas continues to operate at a high level.

ZINC.—Demand for zinc continues to improve in London, on the Continent, and in the U.S. where the steel industry is now producing at about 97 per cent of its rated capacity. This has resulted in a growing demand for Prime Western from galvanizers, and die-casters are also coming back into the market for special high grade in anticipation of a sharp rise in demand following the opening of the new automobile production season. The price is holding steady at 13½ c. a lb. for Prime Western East St. Louis. It will be interesting to know how much of the metal was offered to the G.S.A. last month in view of the improved tone of this market and the reports that further tonnages of the metal have been bought in Europe against barter transactions.

ALUMINIUM.—In our issue of August 24 we reported that plans for a joint venture in the production of primary aluminium were under discussion between two U.S. firms, Revere Copper and Brass Inc., and the Olin Mathieson Chemical Corporation. The formation of a $231,000,000 company, to be called the Olin-Revere Metals Corporation, has since been announced. It will be owned jointly by Olin Mathieson and Revere Copper and Brass Inc. on a 50-50 basis and will produce 180,000 s.tons of primary aluminium annually. Olin Mathieson has contracted with Olin-Revere on a long-term basis for 120,000 tons of primary aluminium a year. Revere has made a similar contract with the new company for 60,000 tons a year.

Following a thorough discussion of the aluminium scrap situation, 15 U.S. aluminium scrap dealers have advised the Business and Defence Services Administration to remove quantitative limitations on the export of aluminium scrap in the fourth quarter of the year. At a meeting in Washington with BDSA officials, dealers were unanimous in asserting that there was no shortage of aluminium scrap in the U.S. On the other hand, the Aluminium Smelters Industry Advisory Committee at a meeting with BDSA officials a few days previously had recommended that scrap exports be halted entirely in the fourth quarter, contending that the operations of smelters were being affected by inability to get scrap. The third quarter 1956 export quota for aluminium scrap was 4,000 s.tons. A Commerce Department announcement on fourth quarter quota exports is expected during the next two or three weeks.

U.S., German, Swiss and Dutch metal companies have concluded a formal agreement for joint exploration for bauxite and exploitation of finds on a "mutual interest" basis. The signatories are Olin Mathieson, the Vereinigte Aluminium Werke A.G., of Bonn, the Aluminium Industrie Aktiengesellschaft of Lausanne, and N. V. Billiton Maatschappij of the Hague.

ASBESTOS.—The Philadelphia organ, *Asbestos*, reports that the demand for asbestos fibre during the first six months of 1956 was running slightly ahead of the same period last year. All grades of fibre are in ample supply, with the possible exception of crudes. Indications are that the demand for the balance of the year should continue at a slightly higher rate than during the second half of 1955.

CHROME.—The U.S. Department of Agriculture has announced that it will exchange $15,000,000 worth of Government-owned surplus wool for Turkish metallurgical grade chrome ore meeting national stockpile specifications. Offers inviting the exchange are being sent to all firms known to be interested in participating in the proposed transaction. The wool was acquired by the Commodity Credit Corporation under its price support programme.

The Turkish Ministry of Economy and Commerce has published a circular to the effect that foreign exchange earnings from the export of second-quality chrome ore will be paid into a special account at the Central Bank. Payments will be made from this account for the importation of materials and products of prime necessity.

MANGANESE.—The Government of India has announced the imposition of an export duty on manganese ore. The new rates are Rs. 10 per ton in respect of ore with a manganese content of over 38 per cent but not more than 40 per cent; Rs. 20 per ton if the content is over 40 per cent but does not exceed 44 per cent, and Rs. 30 per ton for ore with a manganese content exceeding 44 per cent. Ore with a content of 38 per cent or lower is exempt from duty. The Government's intention, presumably, is that buyers should pay thé duty, but it is evident that they will have no alternative but to call upon the sellers to meet a substantial portion of the charge. This may well lead to a general increse in world manganese prices and a consequent weakening of the metal's position in markets that are becoming increasingly competitive. Having regard to the slump from which India's manganese industry is only now recovering, the Government's action appears to be extremely misguided, to say the least.

The U.K. Treasury has exempted blast furnace ferro-manganese from import duty for a period ending on March 18, 1957. The new Order, known as the Import Duties (Exemptions) (No. 9) Order, 1956 (S.I. No. 1339), which came into operation on August 31, is obtainable from H.M. Stationery Office, or from any bookseller (price 3d., by post 5d.).

The Last Chance Mining Co., Inc., has acquired manganese claims in the Long Valley region of Coconino County, Arizona, and has started a major open-pit operation. A log washer with a daily capacity of 2,000 tons is being erected at the mine site, a camp is under construction, and preliminary mining has been started.

Increased production of stainless steel in the U.S. is foreshadowed by the rapid rise in demand for a relatively new type of alloy in which manganese replaces part of the nickel content. In the new type 201 and 202 stainless steels, the nickel content has been cut approximately by half as compared

with the 300 series. These are the so-called austenitic chromium-nickel-manganese steels containing nitrogen, on which research has been conducted for about 25 years by the Electro Metallurgical Co., division of the Union Carbide and Carbon Corporation. By minimising the consumption of scarce nickel, they are expected to give a further stimulus to the consumption of stainless steels, and should thus constitute an expanding outlet for both chromium and manganese.

MAGNESIUM.—Details of the satellite which the U.S. is planning to launch next year to probe into the secrets of outer space have been revealed by a Detroit company. The spheres will be 20 in. in dia. and will be made of magnesium rugged enough to be fired from giant rockets and will weigh between 21 and 22 lb., with equipment inside. They will shoot through space at nearly 18,000 miles an hour radioing back information to listening posts on earth. The satellite will be absolutely smooth and mirror-bright. Each half will be drawn from a single sheet of magnesium having a thickness of 1/50th of an inch.

The U.S. Bureau of Mines has issued a technical report describing work at its Mississippi Valley Experiment Station, Rolla, Mo., on the development of improved magnesium alloys. The aim is to create more corrosion-resistant, more ductile, and stronger alloys of this lightest of structural metals. After unpromising experiments with nickel and nickel plus manganese as alloying elements, the investigators turned to lithium. They have found that an alloy of 90 per cent magnesium and 10 per cent lithium by weight is ductile and malleable, but lacks strength. Preliminary examinations show that cerium, antimony or silicon give sufficient promise to merit additional tests. The report, known as R.I. 5250, "Experimental Magnesium Alloys containing Nickel, Magnesium, Lithium and Aluminium," can be obtained from the Bureau of Mines, Publications-Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.

MOLYBDENUM.—Climax Molybdenum has announced price cuts of about 30 per cent on molybdenum-base alloy and price increases of about 20 per cent on pure metallic molybdenum. Under the new schedule the base price of molybdenum alloy extruded ingots containing 0.5 per cent titanium is $10.60 per lb. Pure metallic molybdenum extruded ingots are $9.60 per lb. All prices are based on Detroit and are effective from September 1. The U.S. Bureau of Mines predicts that by 1975 the use of molybdenum will have increased by 183 per cent.

NICKEL.—There have been no significant changes in the general pattern of the free nickel market in the U.K. Business is reported to be keeping up well, prices ranging from £1,500 to £1,700 per ton Allocated metal in Britain remains at £519 per ton. On the Continent prices of £2,000 to £2,200 per ton prevail. It is reported that Japan is not entering into fresh commitments for the time being, presumably because she is sold out.

In the U.S. the National Lead Co. announced recently that it had sold and shipped the first lots of metallic nickel produced at its new Crum Lynne, Pa., refinery. Production began on June 1 this year and is increasing steadily, with full production expected by the fourth quarter of 1956. Nickel oxide powder and nickel oxide sinter are now being produced at an annual rate exceeding 15,500 s.tons at the Nicaro plant, operated by the Nickel Processing Corporation, a subsidiary of National Lead. This government-owned facility was returned to operation, with the co-operation of the Cuban Republic, after the outbreak of the Korean war. A major extension of the plant is nearing completion and will increase the existing capacity by approximately 75 per cent.

The London Metal Market

(From Our Metal Exchange Correspondent)

Markets have been quiet this week and there has been a tendency to await developments before entering into commitments. The undertone in copper has remained firm, and there have been indications of a little more interest being shown by Continental consumers now that the holiday period has ended. Rumour has it that at Garfield the A.S. and R. Co. and the Steel Union have agreed on a wage contract similar to the Mine Mill one, but there is no news about Kennecott and the Steel Union where a Federal mediator is said to have entered the negotiations. Meanwhile, labour unrest continues in Northern Rhodesia, and on the 5th instant it was reported that the Copperbelt mines were almost at a standstill.

There has been no special feature in the tin market which maintains a firm appearance in view of the uncertainties concerning the outcome of the talks on the Suez situation. There has been some improvement in American demand for nearby tin and some sales of English have been made to that quarter recently. On Thursday morning the Eastern price was equivalent to £791¾ per ton c.i.f. Europe.

There are signs of some improvement in consumer demand for lead, and with sellers not pressing values have appreciated during the week. The supply position in Europe seems comfortable and all available metal appears to be easily absorbed. In the U.S. it seems that consumer demand is quite good as only token quantities are said to have been offered to the stockpile last month.

European consumption of zinc is maintained at a fairly good level, but in this country restrictions in the motor car industry are not without their effect on consumption. It is reported that America has taken further quantities of the metal against barter transactions, and the market has been firm.

Closing prices and turnovers are given in the following table :—

	August 30		September 6	
	Buyers	*Sellers*	*Buyers*	*Sellers*
Copper				
Cash	£301	£301½	£307½	£308
Three months	£300½	£301	£307	£307½
Settlement	£301½		£308	
Week's turnover	4,700 tons		3,250 tons	
Tin				
Cash	£768	£769	£772	£773
Three months	£765	£766	£768	£768½
Settlement	£769		£773	
Week's turnover	605 tons		875 tons	
Lead				
Current half month	£115½	£115¾	£116½	£117
Three months	£114¼	£114½	£115	£115¼
Week's turnover	1,475 tons		2,025 tons	
Zinc				
Current half month	£94¾	£95¼	£95¾	£96
Three months	£93¾	£94	£94	£94¼
Week's turnover	2,650 tons		2,525 tons	

OTHER LONDON PRICES — SEPTEMBER 6

METALS

Aluminium, 99.5%, £198 10s. per ton
Antimony —
English (99%) delivered, 10 cwt. and over £210 per ton
Crude (70%) £200 per ton
Ore (60%) bases 23s. 6d./24s. 6d. nom. per unit, c.i.f.
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 12s. 0d. lb.
Chromium, 6s. 11d. lb.
Cobalt, 21s. lb.
Gold, 251s. 5½d.
Iridium, £29/31 oz.
Manganese Metal (96%-98%) £259/£265 according to quantity
Magnesium, 2s. 4d. lb.
Nickel, 99.5% (home trade) £519 per ton
Osmium, £24/27 oz. nom.
Osmiridium, nom.
Palladium, £8 0s./£8 10s. oz.
Platinum U.K. and Empire Refined £34/£35 oz. Imported £37 15s. nom.
Rhodium, £42.
Ruthenium, £15/£17 oz.
Quicksilver, £83 10s. ex-warehouse
Selenium, 112s. nom. per lb.
Silver, 78½d. f.oz. spot and 78¾f'd.
Tellurium, 15s./16s. lb.

ORES, ALLOYS, ETC.

Bismuth .. .. 65% 8s. 6d. c.i.f.
20% 3s. 3d. lb. c.i.f.
Chrome Ore —
Rhodesian Metallurgical (semifriable) 48% £16 15s. 0d. per ton c.i.f.
„ Hard Lumpy (45%) £16 15s. 0d.
„ Refractory 40% £10 15s. 0d. per ton c.i.f.
„ Smalls 42% .. £13 15s. 0d. per ton c.i.f.
Baluchistan .. .. .. £17 5s. 0d. c.i.f.
Magnesite, ground calcined .. £28 0s./£30 0s. d/d
Magnesite, Raw (ground) .. £21 0s./£22 0s. d/d
Molybdenite (85% basis) .. 8s. 2½d. nom. per lb. (f.o.b.)
Wolfram and Scheelite (65%) 244s. 0d./248s. 0d. c.i.f.
Tungsten Metal Powder (98% Min. W.) .. 20s. 0d. nom. per lb. (home)
Ferro-tungsten (80%-85%) .. 17s. 0d. nom. per lb. (home)
Carbide, 4-cwt. lots .. .. £41 3s. 9d. d/d per ton
Ferro-manganese, home .. £68 per ton
Manganese Ore Indian
Europe (46%-48%) basis 125s. freight .. .. 105d./106d. nom. per unit c.i.f.
Manganese Ore (43%-45%) .. 98d./99d. nom. per unit c.i.f.
Manganese Ore (38%-40%) .. 92d. nom. per unit.
Brass Wire .. .. .. 3s. 1½d. per lb. basis
Brass Tubes, solid drawn .. 2s. 5½d. per lb. basis

COMPANY NEWS AND VIEWS

Outlook for Copper Shares: R.S.T. and Roan

In view of a rise in the average price of copper received by Mufulira (owned as to 63.98 per cent by Rhodesian Selection Trust) and Roan Antelope Copper Mines during the year ended June 30, 1956, to around £340 per ton from £270 during 1954-55, it was to be expected that profits would show a handsome improvement. Due partly to the higher royalties payable, costs also advanced to about £150 from £133 in the case of Mufulira, and to £166 from £142 at Roan Antelope.

	Mufulira Year to		*Roan Antelope* Year to	
	June 1956	June 1955	**June 1956**	June 1955
Sales (tons) ...	**101,829**	86,391	**95,078**	82,982
	£000's	£000's	**£000's**	£000's
Revenue ..	**35,192**	23,828	**32,548**	22,625
Costs	**18,389**	12,272	**18,527**	12,765
Diff. in value of copper stocks	***837**	*515	***1,009**	*767
Surplus	**17,640**	12,071	**15,030**	10,627
Replacements† ...	**857**	1,191	**443**	744
Profit‡	**16,783**	10,880	**14,587**	9,833

* Credit. † Subject to revision in full year's accounts. ‡ Before taxation. § Including revenue from 9,245 l. tons copper purchased ex stocks released by U.K. Government.

The intriguing question now arises as to whether coppers should be bought at around their present levels. In common with share prices of all Rhodesian producers, both R.S.T. and Roan have experienced fluctuations during 1956. After touching a high point of 58s., against a low level of 43s. 6d., R.S.T. is now priced at about 50s. Roan has come back from its high point of 31s. 3d. to 28s. after falling to 24s. At these prices yields of about 6 per cent for R.S.T. and just above 9 per cent for Roan are offered which, to some extent, discounts the possibility of higher final dividends next month.

On the assumption that a total of about 4s. 6d. net of Rhodesian tax might be paid for the year by R.S.T.—compared with 3s. net in 1954-55—and that Roan might make a distribution of 3s. 6d. against 2s. 6d., yields would become 9 per cent and 12½ per cent respectively. These would appear to be about right in relation to other Rhodesian producers, but in comparing the two the distinction ought to be made that while Roan's quotation represents the value and potential on its copper mine alone, the price of R.S.T. also reflects its large holdings in Chibuluma and other potentially valuable copper and cobalt mines.

Few would argue that these returns are most acceptable, but there must be some apprehension as to what effect future copper price movements might have on share values. At present the outlook is clouded by many uncertainties. Some observers have expressed the opinion that had it not been for Suez a decline to well below £300 would already have taken place. Yet, important bull factors appear to be building up which could quickly reverse the present picture. Potential buyers of copper shares might, however, be best advised to wait a few weeks or so until some of these intangibles have been resolved. But it certainly appears that the right time for entering the copper market is not far off.

Foremost amongst current uncertainties is the question of what may be expected of the U.S. economy under conditions of harder money. Yet despite fear in this respect, there is a growing conviction in the country that business prospects for the remaining of 1956 are distinctly favourable. A major factor in this outlook is the probability of a revival in the automobile industry which could be touched off when 1957 models are introduced shortly. Although copper stocks are reported to be extremely high in the U.S., such an event could bring about a sharp demand for metal.

LONDON STOCK EXCHANGE PRICES — AUGUST 30 - SEPTEMBER 5, 1956

Finance	Price Sept. 5	+ or — on week
African & European ..	3 3/16	—1/16
Anglo American Corpn.	7⅛	—⅛
Anglo-French	23/-	—6d
Anglo-Transvaal Consol.	1 5/16	—1/16
Central Mining (£1 shrs.)	54/3	—1/3
Consolidated G'fields ..	59/6	—6d
Consol. Mines Selection.	1 11/16	.....
East Rand Consols	1/9	.....
General Mining	3¼	+1/16
H.E. Prop.	8/9	—3d
Johnnies	38/6	—6d
Rand Mines	3 1/16	.....
Rand Selection	1 1/16	—1/16
Union Corporation	36/9	—1/-
Vereeniging Estates	4 11/16	+1/16
Writs	1 1/32	.....
West Wits.....	36/9	—3d
Rand Gold		
Blyvoors.....	21/9	—6d
Brakpan	6/4½	.....
Buffelsfontein	27/7½	—1/-
City Deep	11/3	+4½d
Consol. Main Reef	13/10½	—6d
Crown	1 1/32	—1/16
Daggas	2 1/32	—1/16
Dominion Reefs	18/3	.....
Doornfontein	21/-	—6d
Durban Deep	1 11/16	.....
E. Champs.....	3/-	.....
E. Daggas	9/4½	—1½d
E. Geduld (4s. units)....	28/-	.....
E. Rand Props.	47/6	.....
Geduld	3½	.....
Govt. Areas.....	4/-	+3d
Grootvlei	19/4½	+6d
Hartebeestfontein	39/4½	.....
Libanon	7/-	—3d
Luipards Vlei	13/-	.....
Marievale.....	21/1½	.....
New Kleinfontein.....	3/10½	+3d
New Pioneer	14/6	—3d
Randfontein	38/3	—6d
Robinson Deep.....	9/1½	—1½d
Rose Deep	9/6	+3d
Simmer & Jack	4/-	+4½d
S.A. Lands	1 1/16	—1/16
Springs	2/6	—1½d
Stilfontein	24/4½	—10½d
Sub Nigel.....	1 1/32	—1/16
Vaal Reefs	30/6	—1/1½
Van Dyk	2/6	+3d
Venterspost	13/9	—4½d
Vlakfontein	16/10½	—3d
Vogelstruisbult	16/1½	—3d
West Driefontein	5 5/16	.....
Rand Gold contd.		
W. Rand Consolidated..	1 17/32	—1/16
Western Reefs	28/3	—1½d
O.F.S. Gold		
Freddies	8/3	.....
Fre.ldies Consolidated..	4/-	.....
F.S. Geduld.....	4 1/16	—1/16
Geoffries	7/6	—6d
Harmony	26/9	—9d
Loraine	5/10½	—1½d
Lydenburg Estates	15/7½	—1/3
Merriespruit	7/6	—3d
Middle Wits	11/6	—3d
Ofsits	57/6	—1/-
President Brand	2 11/16	+1/16
President Steyn	33/3	—4½d
St. Helena	28/3	—9d
Virginia Ord.	9/7½	—1½d
Welkom	18/6	—9d
Western Holdings.....	3 1/16	—1/16
West African Gold		
Amalgamated Banket...	1/6	+1½d
Ariston	4/-	+1½d
Ashanti	15/6	+6d
Bibiani	2/1½	—1½d
Bremang	1/3	.....
G.C. Main Reef	1/7½	.....
Konongo	1/7½	+1½d
Marlu.....	1½d	.....
Taquah.....	1/10½	+1½d
Western Selection	8/-	+1½d
Australian Gold		
Gold Mines of Kalgoorlie	13/9	.....
Great Boulder Prop.	11/3	.....
Lake View & Star	16/7½	—4½d
Mount Morgan.....	19/6XD	—6d
North Kalgurli	7/-	.....
Sons of Gwalia	2/9	—1½d
Western Mining	10/6	+1½d
Miscellaneous Gold		
Cam & Motor	7/6	.....
Champion Reef	6/4½	.....
Falcon Mines	7/9	.....
Globe & Phoenix	23/9	.....
Motapa	10½d	.....
Mysore.....	3/6	.....
Nundydroog	9/4½	—9d
St. John d'El Rey	31/-	—2/6
Zams	2 1/32	.....
Diamonds and Platinum		
Anglo American Inv.	9	+1/16
Casts.....	25/1½	.....
Cons. Diam. of S.W.A. .	10/9	+3d
De Beers Defd. Regd....	5½	.....
De Beers Pfd. Regd.	13½	.....
Pots Platinum	13/10½	—3d
Waterval	23/3	.....
Copper		
Bancroft	50/-	—6d
Chartered.....	72/-	—3d
Esperanza	3/1½	—3d
Messina	8½	—1/16
Nchanga	14	+1/16
Rhod. Anglo-American.	5 1/16	+1/16
Rhod. Katanga	43/3	—1/6
Rhodesian Selection....	50/-	—3d
Rhokana	43	+½
Rio Tinto	4 1/16	+1/16
Roan Antelope	27/9	+9d
Selection Trust	4 11/32	+1/32
Tanks	7 1/16	+1/16
Tharsis Sulphur Br.	4¼	.....
Tin (Eastern)		
Ayer Hitam	20/3	.....
Gopeng	9/9	+3d
Hongkong	5/4½	.....
Ipoh	25/-	+1/-
Kamunting	9/-	.....
Kepong Dredging.....	3/3	.....
Kinta Tin Mines	15/3	+3d
Malayan Dredging	10/3	+1½d
Pahang	11/7½	+3d
Pengkalen	15/6	+2/1½
Petaling	7/4½	.....
Rambutan	21/-	+2/6
Siamese Tin	10/3	+3d
Southern Kinta	15/7½	+1½d
S. Malayan	7/3	+1½d
S. Tronoh	5/9	+3d
Sungei Kinta	14/6	+3d
Tekka Taiping	7/7½	+1/1½
Tronoh	9/6	+1½d
Tin (Nigerian and Miscellaneous)		
Amalgamated Tin	10/6	+6d
Beralt Tin	50/3	+1/3
Bisichi	4/1½	.....
British Tin Inv.	20/4½	—9d
Ex-Lands Nigeria	2/-	—1½d
Geevor Tin	16/4½	+6d
Tin (Nigerian and Miscellaneous) contd.		
Gold & Base Metal	1/1½	.....
Jantar Nigeria	4/6	.....
Jos Tin Area	12/3	.....
Kaduna Prospectors ...	1/6	.....
Kaduna Syndicate	2/-	—3d
London Tin	8/10½	—4½d
United Tin.....	1/-	.....
Silver, Lead, Zinc		
Broken Hill South	62/6	.....
Burma Mines	4/1½	—1½d
Consol. Zinc	64/4½	+5/7½
Lake George	14/-	.....
Mount Isa	23/6	+1/3
New Broken Hill	51/-	+3/6
North Broken Hill	101/-	+1/6
Rhodesian Broken Hill.	11/-	.....
San Francisco Mines ...	26/6	+6d
Uruwira	4/6	.....
Miscellaneous Base Metals and Coal		
Amal. Collieries of S.A..	51/3	+3d
Associated Manganese..	39/3	—1/-
Cape Asbestos	9/7½	—1½d
C.P. Manganese	23/9XD	—1/-
Consol. Murchison	2 1/32	+1/32
Natal Navigation	3¼	+1/16
Turner & Newall	104/9	—1/1½
Wankie	17/3	—1½d
Witbank Colliery	5	.....
Canadian Mines		
Dome	$27	.....
Hollinger	$53¾	—1¼
Hudson Bay Mining ..	$168½	+½
International Nickel....	$203½	+1
Mining Corpn. of Canada	£9½	.....
Noranda	$123½	+½
Quemont	£10	—¼
Yukon	5/4½	—3d
Oil		
Apex	43/3	—6d
Attock	36/-	—1/-
British Petroleum	7½	—1/16
Burmah	92/6	+1/-
Canadian Eagle	64/3	—9d
Mexican Eagle	21/7½	.....
Shell	7⅛	+1/16
T.P.D.	47/9	—1/6
Ultramar	41/3	—4½d

On the labour front it is virtually certain that the coming months will not remain free from industrial unrest in at least two of the major producing centres. Looking further ahead there is also the recent estimate of Anaconda Copper's chairman to think about, namely that by 1960 world copper consumption will amount to 4,620,000 of new copper yearly (compared with the 1955 figure of near the 2,800,000 ton mark). Any prolonged retreat from present price levels, therefore, seems out of the question.

Meanwhile, although some decrease in profits should be expected from Roan during 1956-57, this may not prove to be the case at Mufulira in view of that company's scheduled expansion to some 140,000 tons of copper per annum. In either case, dividends do not appear unduly vulnerable.

London Markets Easier: Mining Issues Subdued

During the past week the London Stock Exchange had to contend with several adverse factors. The severe fall in gold and dollar reserves was followed by a clash between Trade Unions and Mr. Macmillan on wages restraint and Suez continued to restrict trading to a minimum. Reflecting these conditions the *Financial Times Industrial Ordinary Index* declined from 184.1 on August 30 to 183.1 by September 5 Although some good features appeared amongst mining issues—notably in the Australian lead-zinc section—markets were subdued. The undertone, nevertheless, remained steady. A technical rally took place on Wall Street which raised the *Dow Jones Industrial Index* to 509.82 from 495.96. Fears in the U.S. about further rises in money rates were being shelved and investment demand appeared. Leading oils reacted favourably. Hopes of a workable settlement over Suez gained ground. Trading, however, remained small, and markets both in the U.S. and Canada were closed on September 3 which was Labour Day.

Amongst Kaffirs some attention continued to be directed towards marginal gold mines which could benefit from a possible Government subsidy, but there was little going on in the gold share market as a whole. Over the week the *Financial Times Gold Share Index* shed 1.4 of its previous gains to 79.9. A firm spot was President Brand which were a good market and acted better than other O.F.S. issues. West African issues were generally harder on the news of Government help for gold mines.

Good Progress at F.S. Saaiplaas

Work is proceeding apace at New Cons. Gold Fields' Free State Saaiplaas mine, writes our South African correspondent. Steady progress is being maintained with the building of workshops. The erection of headgears at Nos. 1 and 2 shafts is under way. No. 1 shaft is down over 60 ft. with the collar poured, and the winder houess are under construction. The main reason for the delay in the start of major sinking operations has been the borehole programme around their perimeters. Cement has been pumped at pressure down them to seal off any water-bearing fissures which may exist. This method has been used with success at St. Helena. If successful, this cementation will virtually eliminate delays in sinking operations, apart from providing safer conditions.

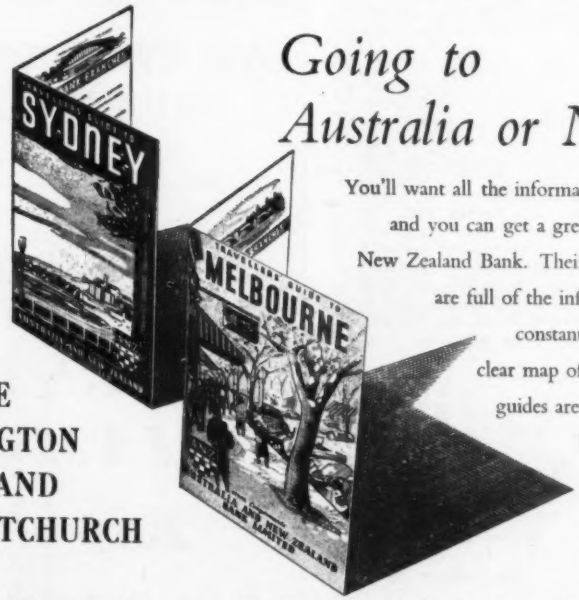
Expansion of Geevor's Assets

Total assets of Geevor Tin Mines at March 31, 1956, expanded to £506,295 from £449,703 previously. Fixed assets at £86,807 remained virtually unchanged from the preceding year's figure of £87,982 but current assets improved sharply to £419,488. This was mainly accounted for by an increase in book value of investments to £274,831 (£242,532) which had a market value at March 31, of £274,938. Tax reserve certificates also moved up to £41,850 from £33,025 and cash to £49,239 from £33,119. Current liabilities and future taxation of £96,988 compared with £91,859.

During the past financial year Geevor mined 57,839 tons of ore which yielded 652 tons of black tin representing an average recovery of 26.36 lb. of black tin per ton milled. Compared with the previous year both tonnage and recovery per ton were better. Net profits, after taxation, declined to £46,268 from £51,736, of which dividends absorbed £26,703 (£26,316) and the balance carried forward rose to £14,449 from £10,429.

Kundang Maintains 20 Per Cent Interim.—An interim of 20 per cent (less 30 per cent Malayan income tax) has been declared by Kundang Tin Dredging on its issued capital of £125,000, in respect of the year ending December 31, 1956. During the previous twelve months dividends totalling 50 per cent were paid.

Broken Hill to Issue 6,000,000 £1 Shares at Par.—The Broken Hill Proprietary Company has decided to make an



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issue to shareholders of approximately 6,000,000 shares at £1 each at par payable in full during the first quarter of 1957. Should anything exceptional occur requiring a change of plans, a prompt public announcement would be made.

Zandpan Deflection Value.—A fourth deflection of Borehole Z.6 at Zandpan Gold Mining cut the Vaal Reef at a depth of 7,209 ft. Values obtained amounted to 5.18 dwts. of gold per ton over a corrected width of 40.5 in., equivalent to 210 in. dwts. Core recovery was practically complete. No further deflections will be made.

Beralt Tin Earns More and Pays More.—Profits earned by Beralt Tin and Wolfram during the year ended March 31, 1956, increased sharply to £983,247 from £729,054 previously. After taxation of £557,043 (£398,484) net profit was £426,204 against £330,570. Dividends on the issued ordinary capital of £331,000 in stock units of 5s. were raised to 160 per cent for the year compared with 130 per cent during 1954-55. These payments absorbed £434,520 (£323,285) and an amount of £253,470 (£261,785) remained to be carried forward. Mr. F. Gates is chairman.

Malaysiam's Financial Asset Position.—Reflecting Malaysiam Tin's recent reduction in issued capital to £89,325 in ordinary 3s. shares from £148,876 previously, the company's total assets shown on the balance sheet at March 31, 1956, contracted to £164,272 from £191,963. Fixed assets were reduced to £76,069 from £106,414 but current assets improved slightly to £88,203 from £85,549. Investments shown at a cost of £14,130 had a market value at March 31, of £16,858. Current liabilities and future taxation moved up to £58,585 from £6,994. Sir Joseph Ball is chairman. Meeting, London, September 19.

General Mining Conversion Rights.—General Mining and Finance Corporation has reminded holders of the 6 per cent Cumulative Convertible Redeemable "A" Preference shares that they are entitled to convert into ordinary shares at varying prices until September 30, 1959. After that date all shares not converted will be redeemed by the Corporation not later than September 30, 1969.

Until September 30, 1956, five "A" Preference shares may be converted into one ordinary. Thereafter, until September 30, 1958, the conversion rate will be 11 "A" Preference shares for two ordinary. In the year ending September 30, 1959, holders may convert six "A" Preference into one ordinary.

Gold Coast Wage Increases.—The Gold Coast Chamber of Mines has reached satisfactory agreement with the Mines Employees' Union upon wage increases for miners employed by gold and bauxite companies.

The new rates, which are to be effective from June 1, 1956, represent an increase of between 10 per cent and 12½ per cent for the various categories. These increases have been made possible by financial aid from the Gold Coast Government who have agreed to make a grant of £200,000 to assist the following mines:—Amalgamated Banket Areas, Bibiani 1927, Bremang Gold Dredging, and Gold Coast Main Reef. This grant will be spread over a period of two years.

The Gold Coast Government have also agreed that the Minerals Duty will be replaced by a form of tax which will be eligible for double taxation relief. This will be brought into effect by early legislation and will affect the whole Gold Coast mining industry. This proposed tax legislation, it is stated, wi'l go far towards meeting the extra wages cost of the mines concerned which are:—Ariston Gold Mines, Ashanti Goldfields Corporation, Consolidated African Selection Trust and Konongo Gold Mines.

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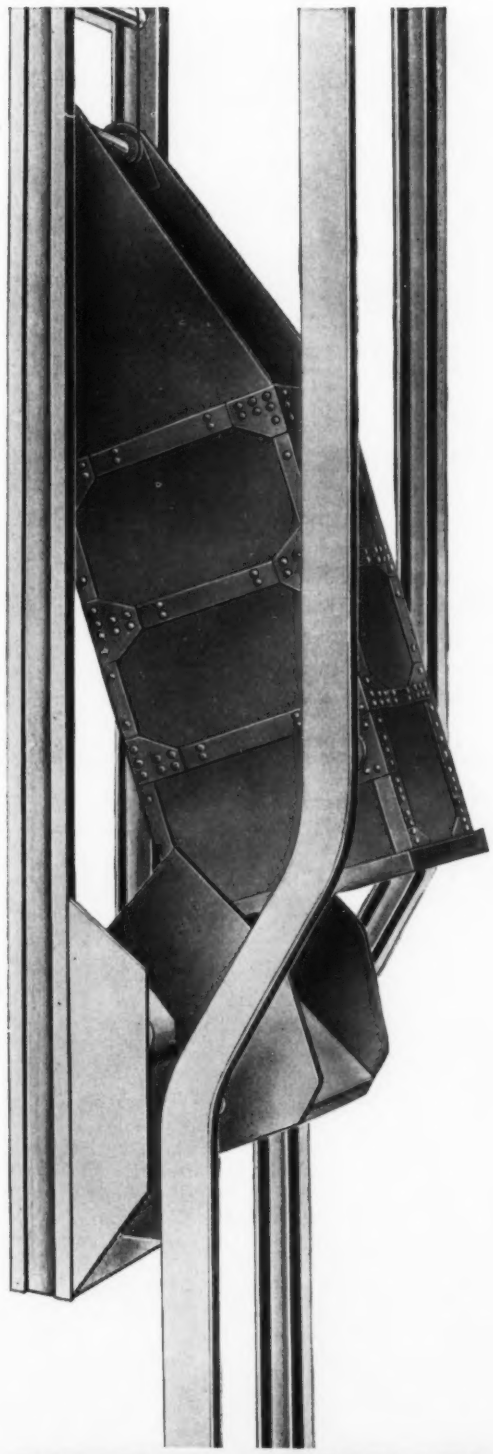

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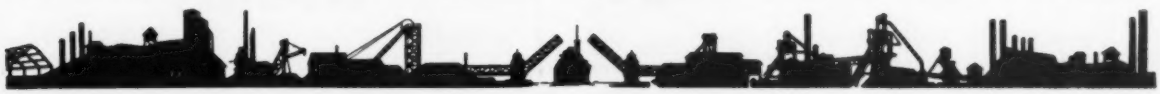

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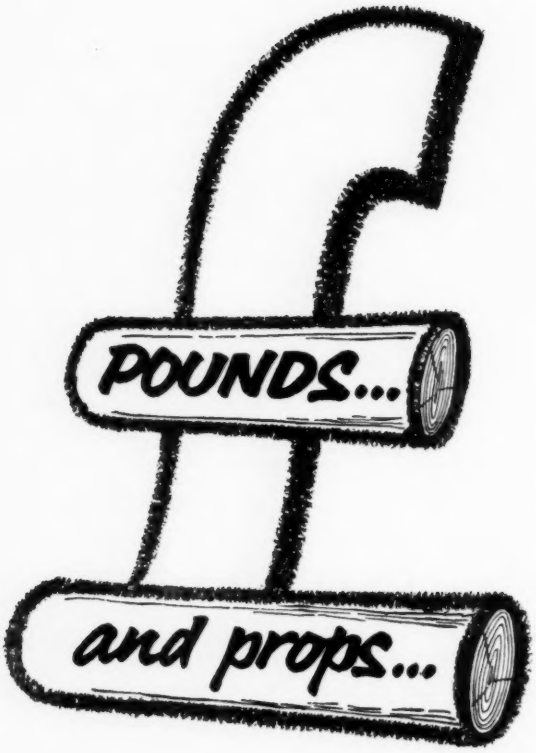

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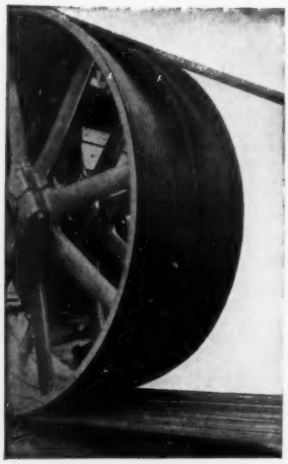

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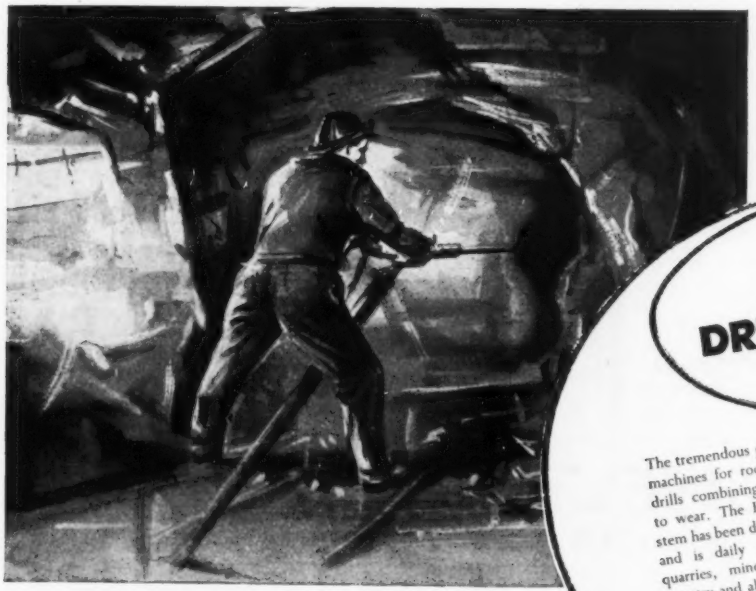

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